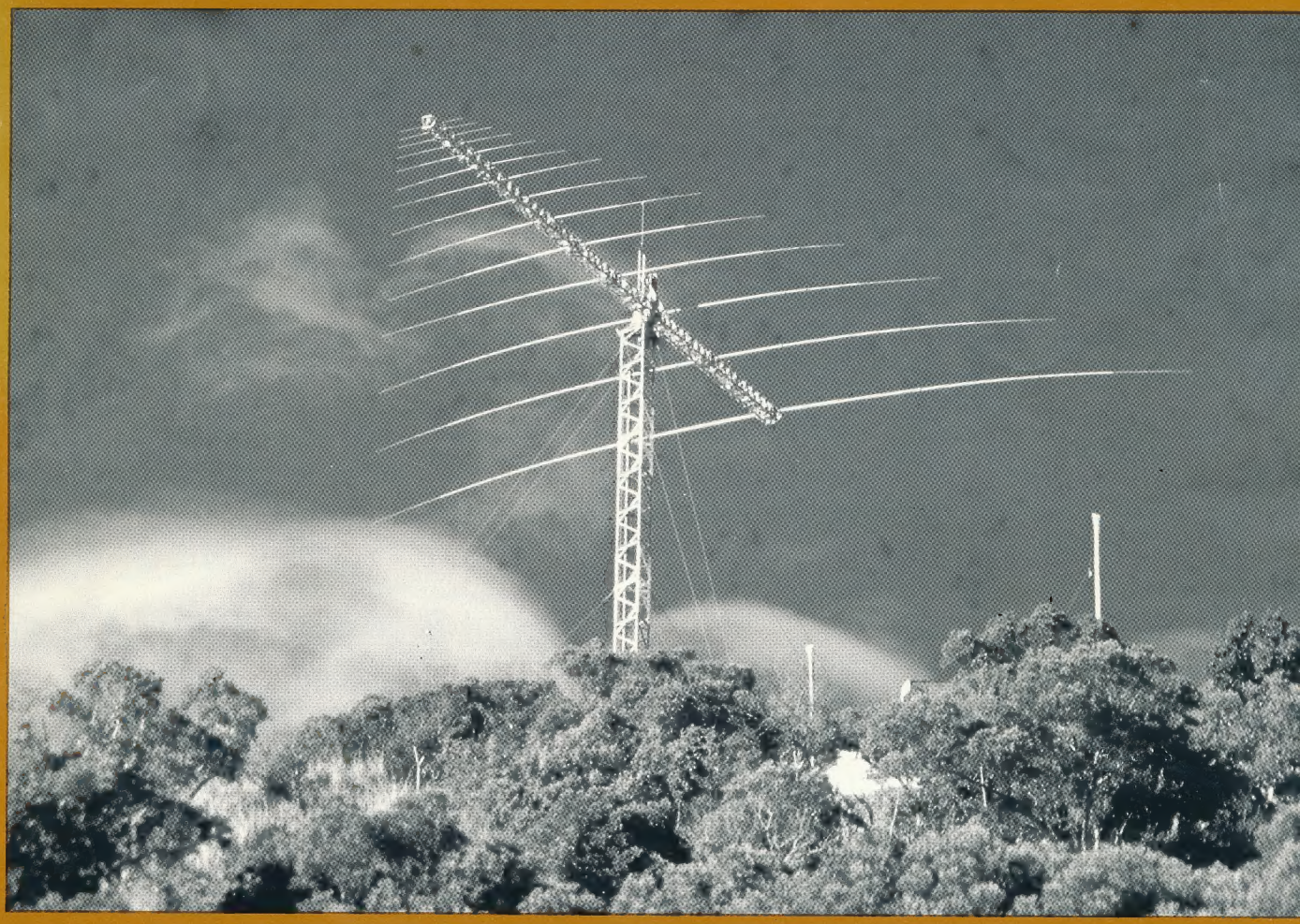
amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA



VOL. 49, No. 12 DECEMBER 1981

FEATURED IN THIS ISSUE:

- ★ DEVELOPING THE HF BEAM
- ★ QRP CW TRANSMITTER WITH BREAK-IN — PART 1
- ★ PLANNING FOR AUSTRALIA'S DOMESTIC SATELLITE SYSTE
- ★ JOHN MOYLE MEMORIAL FIELD DAY CONTEST RULES

Registered by Australia Post — Publication No

UNREPEATABLE OFFER - BUY NOW!

Amazing scoop!

YES we have scooped a further 50 units of the ever popular FT207R

THE LAST 50 IN THE WORLD!

AUTOSCAN
Up or down scanning of full band, with 3-way setting — clear, busy or manual.

DIGITAL DISPLAY
Large easy to read LED readout. Auto turn-off for power saving too!

Specifications:
- 144-148MHz band coverage in 800 channels.
- High and low power (400mW-2.5W)
- .32uV sensitivity — 7.5kHz selectivity
- NiCad battery pack and charger included in price
- External antenna, ear, microphone socket.
- Compact size — 180 x 65 x 55mm
- Rubber Duck antenna included.

800 CHANNELS (4 memory channels)
Instant recall of your 4 favourite repeaters or simplex frequencies. (Easy to read program)

19 key easy to use keypad. For frequency input, memory recall, scanning etc.

Normally ~~$358~~
~~August only at~~ Extended to September by public demand!
$295
Cat. D-2888 P&P $5.50

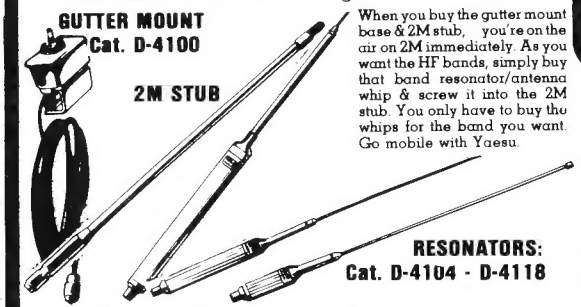
SPECIAL OFFER

FREE If you purchase a D-4100 base with resonator, we will give a **FREE** 2M stub (D-4102) worth $11.25 at no extra charge.

GUTTER MOUNT Cat. D-4100

2M STUB

When you buy the gutter mount base & 2M stub, you're on the air on 2M immediately. As you want the HF bands, simply buy that band resonator/antenna whip & screw it into the 2M stub. You only have to buy the whips for the band you want. Go mobile with Yaesu.



RESONATORS: Cat. D-4104 - D-4118

RSE - M - 2 GUTTER MOUNT. Cat. D-4100	$24.95	RSL - 7 40M ANTENNA Cat. D-4112	$25.50
RSE - 2A 2M STUB Cat. D-4102	$11.25	RSL - 14 20M ANTENNA Cat. D-4114	$25.50
RSL - 145 6M/2M ANTENNA Cat. D-4104	$27.50	RSL - 21 15M ANTENNA Cat. D-4116	$25.50
RSL - 3.5 80M ANTENNA Cat. D-4110	$25.50	RSL - 28 10M ANTENNA Cat. D-4118	$25.50

ALL NEW Yaesu 2 Metre 50W/All Mode Linear amp

Add to hand held above for real mobile power. Also suitable for SSB, CW AM etc. Operates from 13.6V DC up to 15W input for maximum power. Includes 12dB receiver, pre-amp. with automatic transmit receive control.

(above hand held may not drive to full power)

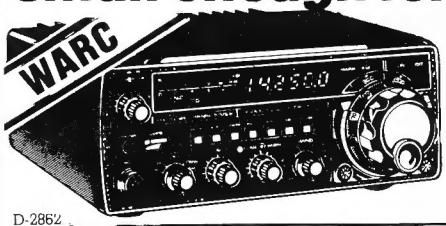
Cat. D-2547

$239

P&P $5.50

EXCLUSIVE: Receiver pre-amp built-in

MULTI MODE HF t'ceiver small enough for a mini car!



The FT707 has to be one of the fastest selling transceivers we've ever had to offer. And it's no wonder! Look at what you get: full power operation, digital display, LED S/power meter, plus push button operation . . . all the things the amateur needs for safe, yet reliable mobile operation. Or why not team it up with the FP707 supply (D-2895), it makes a great base!

ONLY $795.00

D-2862

REMEMBER: We will match or beat any genuine advertised price!

DICK SMITH Electronics

BURN 648 0558
EHURST 546 7744
DWAY 211 3777
STOWN SQ. 888 3200
KVALE 93 8922
- CHULLORA 642 8922
- GORE HILL 439 5311
- PARRAMATTA 683 1133
- SYDNEY 290 3377
- NEWCASTLE 61 1896
- WOLLONGONG 28 3200
- CANBERRA 80 4944
- BURANDA 391 6233
- CHERMSIDE 59 6255
- ADELAIDE 212 1962
- DARLINGTON 298 8977
- ENFIELD 260 6088
- MELBOURNE 67 9834
- RICHMOND 428 1614
- SPRINGVALE 547 0552
- COBURG 383 4455
- PERTH 328 6944
- CANNINGTON 451 8666

welcome here

®

AIL ORDER CENTRE: P.O. Box 321 North Ryde, NSW. 2113. Ph. (02) 888 3200

A009 MB

Published monthly as its official journal by the Wireless Institute of Australia, founded 1910.

ISSN 0002 - 6859.

amateur radio

DECEMBER 1981
VOL. 49, No. 12

Registered Office:
3/105 Hawthorn Road,
Caulfield North 3161.
Tel. (03) 528 5962

EDITOR:
BRUCE BATHOLS* VK3UV

PRODUCTION MANAGER:
BILL BALY

TECHNICAL EDITORS:
BILL RICE* VK3ABP
EVAN JARMAN* VK3ANI
RON COOK* VK3AFW
GIL SONES* VK3AUI

CONTRIBUTING EDITORS:
BOB ARNOLD VK3ZBB
G. NICK NICHOLS VK6XI
ROY HARTKOPF* VK3AOH
RON FISHER* VK3OM
ERIC JAMIESON VK5LP
LEN POYNTER* VK3BYE
BILL VERRALL VK5WV
KEN McLACHLAN VK3AH
REG DWYER VK1BR
ROBIN HARWOOD VK7RH

DRAFTING:
NEIL OSBORNE* VK3YEI
PETER KIMBER
SUZY ZLOCH

BUSINESS MANAGER:
PETER DODD VK3CIF

***Member of Publications Committee**

Enquiries and material to:
The Editor,
PO Box 150, Toorak, Vic. 3142

Copy is required by the **first of each month.** Acknowledgement may not be made unless specially requested. All important items should be sent by certified mail. The editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

Material should be sent direct to **P.O. Box 150, Toorak, Vic , 3142,** by the **25th of the second month preceding publication. Phone: (03) 528 5962.** Hamads should be sent direct to the same address by the **1st of the month preceding publication.**

Trade Practices Act: It is impossible for us to ensure that advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with strictly. Readers are reminded that, when buying, obtaining or receiving goods from overseas including goods listed in advertisements by overseas organisations in this Journal, Customs import duties and Sales Tax may be levied on the goods at the time of importation. These amounts, if any, are payable by the purchaser unless the terms of sale state otherwise and the seller has made specific provision to this effect in his quotation to the buyer or unless other prior arrangements are in force between the buyer and the seller.

Typesetting: MUELLER GRAPHICS PTY. LTD.
1a Levanswell Road, Moorabbin, 3189
Tel.: 553 0292

Printers: WAVERLEY OFFSET PUBLISHING GROUP
Geddes Street, Mulgrave 3170

CONTENTS

ARTICLES

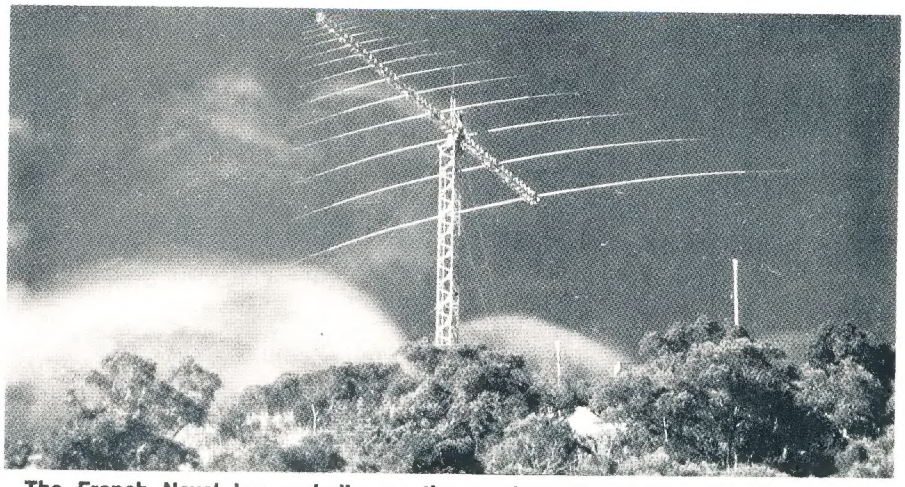
Developing the HF Beam 6
QRP CW Transmitter with Break-In — Part 1 12
A New Frequency Counter Update 14
Planning for Australia's Domestic Satellite System 16
Quarrelsome Components 20
John Moyle Memorial Field Day Contest Rules 35
The Active Short Monopole Receptor 48

ADVERTISERS' INDEX 50

DEPARTMENTS

ALARA 40
AMSAT Australia 24
Around the Trade 37
Awards Column 38
Contests 34
Education Notes 36
Forward Bias 22
Hamads 51
How's DX 28
Index to Volume 49 30
Intruder Watch 44
Ionospheric Predictions 46
Letters to the Editor 48
Main QSP 4
National EMC Advisory Service 44
Novice Notes 45
Obituaries 50
QSP 18
Silent Keys 50
Spotlight on SWLing 31
Technical Correspondence 48
Try This 42
VHF-UHF — an expanding world 26
VK2 Mini Bulletin 22
VK4 Notes 23
WIANEWS 4
WICEN 33

Cover Photo



The French Naval log periodic, on the southern tip of New Caledonia. This magnificent structure stands about 65 metres high. The boom can be walked along. Yes, it does rotate with the help of a real heavy duty rotator, which is probably diesel-powered — no doubt to keep electrical interference to a minimum. What would the local council think of that?

Photo: George Brzostowski VK1GB.

QSP

THE FRIENDLY AMATEUR

"The amateur is friendly . . . slow and patient sending when requested, friendly advice and counsel to the beginner, kindly assistance, co-operation and consideration for the interests of others; these are marks of the amateur spirit."

Paul Segal's Amateurs' Code has as much relevance today as it had so many years ago in the infancy of our hobby.

The amateur today is in a unique position to stretch out the hand of friendship and to establish and maintain a very personal form of international goodwill and understanding — but how many contacts do you overhear (even local QSOs) where COMMUNICATION does not really take place beyond the exchange of signal reports and even then it's all "5/9".

We have all been guilty of this at some time.
Perhaps Paul Segal's code should be expanded to include reference to LISTENING and therefore COMMUNICATING with the other operator.

Another year draws to a close and many of us are looking forward to a well-earned break from the tedium of modern life — the portable gear dusted off and installed at the favourite holiday QTH — and hopefully the AMATEUR SPIRIT will prevail.

On behalf of all WIA officers and staff, both Federal and State, I extend to all readers, contributors and advertisers sincere good wishes for Christmas and a happy and worthwhile year.

P. WOLFENDEN VK3KAU, Federal President ■

WIRELESS INSTITUTE OF AUSTRALIA

Federal President: Mr. P. A. Wolfenden VK3KAU
Federal Council:
VK1 Mr. R. G. Henderson VK1RH
VK2 Mr. T. I. Mills VK2ZTM
VK3 Mr. A. R. Noble VK3BBM
VK4 Mr. A. R. F. McDonald VK4TE
VK5 Mr. G. Preston VK5PI.
VK6 Mrs. Jennifer Warrington VKS ANW
VK7 Mr. P. Fudge VK7BQ

Staff: Mr. P. B. Dodd VK3CIF, Secretary.
Part-time: Col. C. W. Perry, Mrs. Ann McCurdy.
Mr. Bill Baly (AR Production).

Executive Office: 3/105 Hawthorn Rd., Caulfield North, Vic. 3161. Ph. (03) 528 5962.
Divisional Information (all broadcasts are on Sundays unless otherwise stated).

ACT:
President — Mr. W. R. Maxwell VK1MX
Secretary — Mr. C. T. Vidler VK1KV
Broadcasts— 3570 kHz and 2m Ch. 6 (or 7): 10.00Z.

NSW:
President — Mr. A. D. Tilley VK2BAD
Secretary — Ms. S. J. Brown VK2BSB
Broadcasts— **1100 and 1930 local time.** Frequencies bracketed at 1100 only.
1.8125 — Ncle relay, 1.825 — Sydney relay, 3.595 (7.146), 28.32, 52.12, 52.525, 144.12 MHz. Repeater Ch. 6650 Oberon (6700 Orange), 6750 Gosford (6800 Lismore), 6850 Wollongong, 7000 Sydney, 8525 Sydney.

VIC.:
President — Mr. P. R. Drury VK3JN
Secretary — Mr. D. X. Clarke VK3DES
Broadcasts— 1840, 3600, 7135 kHz — 53.032 AM, 144.2 USB and 2m Ch. 2 (5) repeater: 10.30 local time.
Gen. Mtg. — 2nd Wed., 20.00.

QLD.:
President — Mr. D. Laurie VK4DT
Secretary — Mr. F. J. Saunders VK4AFJ.
Broadcasts— 1.825, 3.580, 7.120, 14.342, 21.175, 28.400, Rpt. Ch. 6700 and 7000 Sundays from 0900Z (Sat. 2300 UTC).
Re-broadcasts—Mondays 3.605 from 1930Z, Mondays 80 or 20m RTTY segment from 200Z.

SA:
President — Mr. J. B. Mitchell VK5JM
Secretary — Mr. W. M. Wardrop VK5AWM
Broadcasts— 1820, 3550, 7095, 14175 kHz; 21.195 28.470 and 53.1 MHz, 2m (Ch. 8): 09.00 S.A.T.
Gen. Mtg. — 4th Tuesday, 19.30.

WA:
President — Mr. B. Hedland Thomas VK6OO
Secretary — Mr. F. Parsonage VK6PF
Broadcasts— 3560, 7075, 14100, 14175 kHz. 28.47, 53.1 MHz. 2 metres Ch. 2 Perth, Ch. 6 Wagin. Time 0130Z.
Gen. Mtg. — 3rd Tuesday.

TAS.:
President — Mr. I. F. Ling VK7XL
Secretary — Mr. P. Clark VK7PC
Broadcasts— 7130 (SSB) kHz with relays on 6 and 2m Ch. 2 (S), Ch. 8 (N), Ch. 3 (NW), 09.30 EST.

NT:
President — Mr. T. A. Hine VK8NTA
Vice-Pres. — Barry Burns VK8DI
Secretary — Robert Milliken VK8NRM
Broadcasts— Relay of VK5WI on 3.555 MHz and on 146.5 MHz at 2330Z. Slow morse transmission by VK8HA on 3.555 MHz at 1000Z almost every day.

Postal Information:
VK1 — P.O. Box 46, Canberra, 2600.
VK2 — 14 Atchison St., Crows Nest, 2065 (Ph. (02) 43 5795 Mon, Tues & Thurs 9.45-13.45h). P.O. Box 123, St. Leonards, NSW 2065.
VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 417 3535 Weekdays 10.00-15.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001.
VK5 — G.P.O. Box 1234, Adelaide, 5001 — HQ at West Thebarton Rd., Thebarton.
VK6 — G.P.O. Box 10, W. Perth, 6005.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (incl. with VK5), Darwin AR Club, P.O. Box 37317, Winnellie, N.T., 5789.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.

VK QSL BUREAUX
The following is the official list of VK QSL Bureaux, all are inwards and outwards unless otherwise stated.

VK1 — QSL Officer, G.P.O. Box 46, Canberra, A.C.T. 2600.
VK2 — QSL Bureau, P.O. Box 73, Teralba, 2284.
VK3 — Inwards QSL Bureau, Mrs. B. Gray VK3BYK, 1 Amery Street, Ashburton, Vic. 3147.
VK3 — Outwards QSL Bureau, C/o 412 Brunswick St., Fitzroy, 3065
VK4 — QSL Officer, G.P.O. Box 638, Brisbane, Qld., 4001
VK5 — QSL Bureau, Mr. Ray Dobson VK5DI, 16 Howden Road, Fulham, S.A. 5024.
VK6 — QSL Bureau, Mr. J. Rumble VK6RU, G.P.O. Box F319, Perth, W.A. 6001.
VK7 — QSL Bureau, G.P.O. Box 371D, Hobart, Tas. 7001.
VK8 — QSL Bureau, C/- VK8HA, P.O. Box 1418, Darwin, N.T. 5794.
VK9, 0 — Federal QSL Bureau, Mr. N. R. Penfold VK6NE, 388 Huntriss Rd., Woodlands, W.A. 6018.

WIA NEWS

STICKERS

The DOC in Tasmania, according to reports, is issuing identification labels to be attached to, or located near, licensed radio transmitting equipment. "In the interest of licensees, this new measure will readily identify currently licensed equipment." The notice issued with the labels, which are adhesived backed, states they should, wherever possible, be affixed to the front of the licensed equipment to which they refer. The label must be clearly visible and is issued on licence renewal dates. If more labels are required they are stated to be available on written request with details of the equipment for which they are required.

In so far as the amateur service is concerned the question in many minds is the present legal authority for this action. Strong objections have been expressed and the question will be raised

WIANEWS

with DOC. There are others who see in this action portents of the proposed new legislation — see AR May 1981, page 6.

GENERAL

The Executive Meeting on 22nd October greeted JARL officer Yoshita Tanaka JA6VVS, who was on a visit to Melbourne attending a real estate congress.

An IARU proposal that 18th April be established as World Radio Amateurs' Day was voted on in favour. The IARU was founded on 18th April, 1925. Also voted in favour was the admission to membership of the IARU of the Association des Radio Amateurs de Djibouti.

An extended discussion was held on the role and effectiveness of Intruder Watching. A small sub-committee will meet in November for an in-depth assessment, particularly relating to changes in the Radio Regulations arising out of WARC 79. Another discussion item was the DXCC Award in the light of most thoughtful comments on the subject by the Federal Awards Manager, VK5WV, for publication in AR.

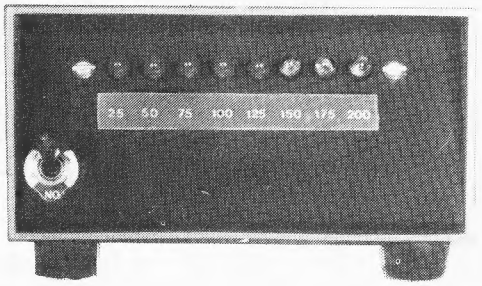
Yet another discussion point centred on the forthcoming IARU Region 3 Conference to be held in Manila from 2nd to 5th April, 1982.

A recent press announcement of a Public Inquiry into Telecommunications Services in Australia was examined to determine what effects this might have, even remotely, on the amateur service. First thoughts were that these would be likely to be minimal. Items for inclusion on an Agenda for an impending joint meeting with DOC were finalised.

Season's greetings. ■

★ NEW ★ NEW ★ NEW

THE HELRAY



- Totally new approach
- Acceptable to the Dept. of Communications
- First ever non-laboratory indicator for true, instantaneous peak output.
- No meters or screens to watch or interpret.
- No more guesswork
- Unambiguous over limit indication.
- Amateur – CB – Commercial Application.
- Good to over 80 MHz
- Three Ranges:-5-40W pep in 5 watt steps; 25-200W pep in 25 watt steps; 150-500W pep in 50 watts steps.
- Completely self contained.
- Calibration or checking with inbuilt DC supply.
- Costs only a fraction of the oscilloscope method.
- Based on the novel system proposed by VK3AFQ.

Write or phone

HELRAY ENGINEERING,

4 Elizabeth Street, East Brighton, 3187

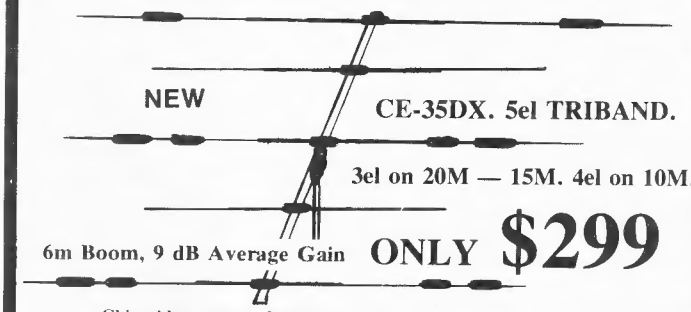
(03) 596 2414 (A.H.)

ONLY $62 COMPLETE

(PLUS POST & PACKAGING)

FOR A BIG SIGNAL

STEP UP TO A HIGH PERFORMANCE CHIRNSIDE ANTENNA SYSTEM



NEW CE-35DX. 5el TRIBAND.

3el on 20M — 15M. 4el on 10M.

6m Boom, 9 dB Average Gain ONLY $299

Chirnside antennas feature:

High grade seamless aluminium tubing.
Zinc plated hardware.
Stainless steel compression clamps for easy adjustment.
Plastic "end caps" on ALL elements.
Colour code system for easy assembly.
SWR of 1.5:1 (or better).
Full 12 month warranty against defects parts and labour.

MULTY BAND BEAMS.
"Heavy Duty Type"

CE-35DX Triband 5el 6M boom 2KW PEP 9 dB av. gain $299
CE-36 Triband 6el 7M boom 2KW PEP 9 dB av. gain $319
CE-35 Triband 5el 6M boom 2KW PEP 8.5DB gain $279
CE-33 Triband 3el 4.2M boom 2KW PEP 8.0DB gain.....$249
CE-42 Duoband 4el 4M boom 2KW PEP 8.5DB gain $149
(3el 10M 3el 15M)
CE-52 Duoband 5el 6M boom 2KW PEP 9.5DB gain $199
(4el 10M 4el 15M)

MULTY BAND VERTICALS

CE-5B 80M thru 10M 9M long 2KW PEP Incl. guy ropes.....$99

MONO BAND BEAMS.
"Heavy duty type"

CE3-10 3el 10M/11M 3M boom 8.5DB gain els start 19MM..... $69
CE4-10 4el 10M/11M 4M boom 9.0DB gain els start 19MM..... $89
CE4-10 4el 10M/11M 6M boom 9.5DB gain els start 19MM $99
CE5-10 5el 10M/11M 6M boom 10.5DB gain els start 19MM....$109
CE5-10 5el 10M/11M 7M boom 11DB gain els start 19MM.....$125
CE6-10 6el 10M/11M 7M boom 11.3DB gain els start 19MM...$135
CE3-15 3el 15M 4M boom 8.5DB gain els start 22MM $79
CE4-15 4el 15M 6M boom 9.5DB gain els start 22MM $99
CE5-15 5el 15M 7M boom 10.5DB gain els start 22MM $119
CE3-20 3el 20M 6M boom 8.5DB gain els start 25MM.....$149
CE4-20 4el 20M 7M boom 9.5DB gain els start 25MM.....$169
CE5-6 5el 6M 4M boom 9.5DB gain $79
CE6-6 6el 6M 6M boom 11DB gain $99
Hi-Q 1:1 50 ohm balun for all beams or dipoles $18

MOBILE HELICALS

CH-80M $23
CH-40M $23
CH-20M $23
CH-15M $21
CH-10M $21
Bumper mount to suit $9

Chirnside antennas are available from the following interstate dealers.

N.S.W.: Andrews Communications Systems (02) 349 5792. TAS.: V.K. Electronics (004) 31 1708. QLD.: Elite Electronics (07) 352 5222 Amateurs Paradise (075) 32 2644. W.A.: Willis Trading (09) 328 9229. S.A.: Set Services (087) 25 2228.

CHIRNSIDE ELECTRONICS PTY. LTD.

26 Edwards Road, Chirnside Park, Lilydale, 3116. Phone (03) 726 7353

Developing the HF Beam

J. A. Taylor VK3AJT
45 The Esplanade, Drumcondra 3215

Since going "commercial" after the "rack and panel" AM days of the late 1940s attention naturally turned to antenas. "Home-brewing" slipped into the background, but the interest in results persisted. What better than the antenna to become the centre of attention?

The earliest beam, around 1948, was of 3 elements on 20 and 4 on 10. The whole was rigged on a timber truss, the members being 3 in. x 2 in. oregon and the tension rods ¾ in. diameter hardwood dowelling. The ½ in. copper elements were on stand-off insulators, carried on a 3 in. x 2 in. oregon base. The assembly was rotated from the bottom using chain drive to the rotating tube from an aeroplane propeller-pitch motor. The driven element was T-matched.

Other antennas were built, some good, some not so good; some stayed up, and some came down. A Telrex array was lost in a freak wind of 110 m.p.h.

QUADS

Approximately 10 years ago it was noticed that one could bet on the fact that the very good signals from "G-land" would be from quad antennas. The quad was originally designed for use in a commercial station, at high altitude, and suffering from a form of heat static in particularly dry air. It was claimed to overcome many of the problems of rain static and man-made interference. Being in a fringe area, but having cured TVI, the comparison between trapped tri-banders and full-size elements was of interest. A quad was the ideal three band antenna with which to try out this comparison.

Much time was spent reading a great number of articles on the quad. From all these, and the information received "over the air", a design was evolved which it was hoped would be unlikely to finish up in a neighbour's backyard, and in which the technical performance would be as good as possible.

There was little information about the physical sizes and stresses in a beam of this type, and this possibly accounts for the failure of a great many quads.

Being engaged in heavy construction business, facilities were avilable for computations of loads. Items of engineering equipment were also available, but could be obtained alternatively from outside sources.

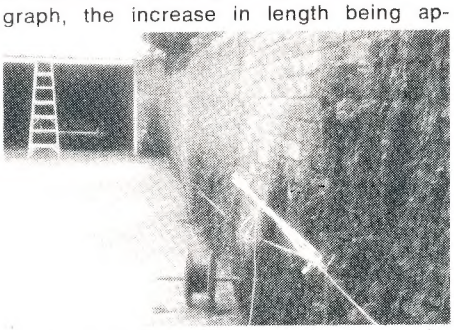
Whilst similar in many respects to the outline given in the ARRL handbook, this includes no sizes of wire or structural members. The electrical dimensions used, and now proven correct, vary somewhat from the ARRL article. The nearest published design is that of K2GAT, described in the antenna handbook by William Hood, and even this does not give any information on physical dimensions. Further, the one described here has five elements, whereas the K2GAT has four. As there is no variation in the dimensions from director to director in a quad, as distinct from the yagi, the addition of the extra element, and the lengthening of the boom from 6.9m (22 ft. 6 in.) to 8.5m (28 ft.) has little effect on the rest of the antenna.

It is not necessary to go into the reasons for the use of members of a specified size, though all sizes are given. The electrical or RF characteristics are also given.

WIRE

The first required decision, which affected the stability of the beam, was the wire size. After hearing of wire sizes in use from 14g SWG down to bell wire, it was decided to use ⅛ in. diameter (3.2 mm). This is 11 SWG or 9 AWG enamelled soft copper. This gauge is heavier than anything quoted "over the air"; but the resonance broadens as the wire becomes heavier and the band coverage, with an acceptable SWR, becomes greater. Also it is better able to withstand high wind.

Sleeving of the wire at points of fastening was considered as being important, so it was necessary to match the diameter of the wire to the sleeving size available, namely ⅛ in. The wire was stretched with a block and tackle, as shown in photograph, the increase in length being ap-



proximately 2 in. for every 10 ft. of wire (17 mm per metre). This not only eliminated kinks, but partly hardened it. Any further stretch could damage the enamel coating. QTH is right over water, with a very high salt content.

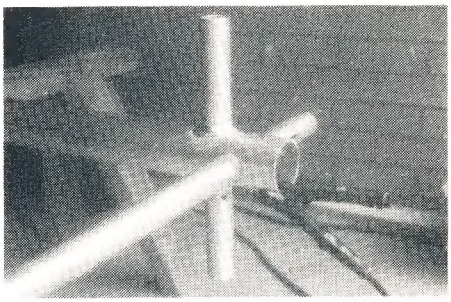
The boom was settled upon as being 2½ in. (63.5 mm) in diameter, and of a wall thickness of 3/16 in. (4.8 mm). This was the nearest readily available to the required size, which could be somewhat lighter than that used.

SPREADERS

Next in importance came the spreaders. Fibreglass, parallel right to the extremities, was chosen, of 1 in. diameter (25.4 mm) and ⅛ in. wall thickness (3.2 mm). The nearest aluminium tube available to this size was 1¼ in. outside diameter, with a wall thickness of 3/32 in., so that the inside diameter was 1-1/16 in. The fibreglass diameter was increased to this. In metrics, the above items were boom 60 mm outside diameter, and the dropper or lower vertical spreaders and the stiffening tubes were 32 mm with a 1.6 mm wall thickness. These were supplied by Alcan of Melbourne.

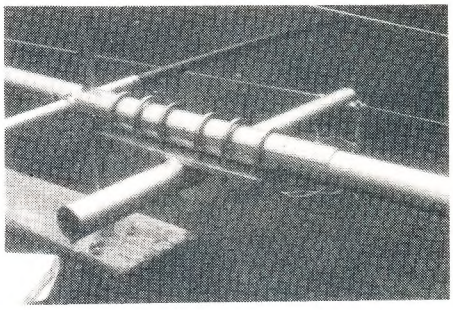
The fibreglass was especially made in Queensland by Len Butterworth Fibreglass of Brisbane, and was now ordered 1-1/16 in. outside diameter, with a wall thickness of ⅛ in., parallel sided right through. Junction pegs to fit into these fibreglass tubes, at joints, were ordered 13/16 in., but arrived at ⅞ in., and were machined down to fit into the glass spreaders.

It was decided to weld all the spreader aluminium components to the boom. This was done under argon gas, and was very successful. As the aluminium tubing softened somewhat in welding, the fibreglass horizontals were taken to meet at the centre, with 12 in. (300 mm) of the smaller diameter peg reinforcing the joint in the middle of the boom. The vertical upper fireglass spreader projected into the aluminium dropper 6 in. 150 mm) below the centre of the boom, again stiffening the junction of the spreader to the boom. The welding of this is shown in photograph.



BRACING

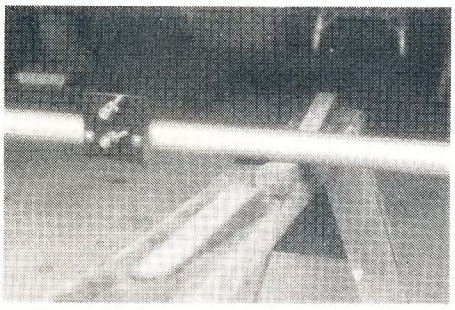
The jointing of the boom in the centre is shown in the next photograph and more importantly the method of side and vertical bracing. In a high wind, a quad develops a screwing or revolving load, and this, with side bending, was considered as being unacceptable, so the boom was not only wire braced vertically, but also horizontally. In the photograph, the vertical is shown



with a temporary cord attached in the position of the wire support. This was only to determine the length between splices of the 3/16 in. (5 mm) stainless steel yacht rigging wire, and its accompanying stainless steel rigging screws. The side horizontal tube supports for the fibreglass horizontal spreaders extend to an overall of 30 in. (750 mm) or 15 in. (375 mm) each side, at the position nearest the mast-to-boom junction only, and these longer tubes take the side supporting ⅛ in. (3 mm) stainless steel wire with stainless steel rigging screws.

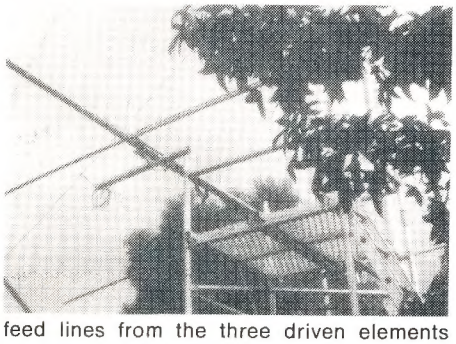
ASSEMBLY

The electrical junction block between driven elements and RG8AU coax cable is shown in the photograph. The block is



2½ in. x 2½ in. x ½ in. fibre (64 x 64 x 13 mm) and is bolted through, and electrically connected to, the lower vertical aluminium dropper, except that the hot terminal is away from the metalwork. Bolts are ¼ in. (6 mm) at the terminals, the remaining two 3/16 in. (5 mm), and all fastenings are stainless steel.

The boom of 28 ft. 6 in. (8.7m) held five radiating quads, spaced 7 ft. (2.13m) apart and 3 in. (80 mm) from the end. All spreaders and boom were fitted with corks closing the tubes, to avoid their whistling in the wind. The assembled metalwork is also shown in a photograph. Note that the



feed lines from the three driven elements are shown installed, from the junction blocks to a connecting point 3ft. (1m) below the boom. In the photo above, these are coiled together. Also it can be seen that one side of the longer horizontal support tube has been removed. This was necessary to clean up a distortion in the weld at the boom. It was, of course, later replaced. Other shorter cross members could be reached inside with a file.

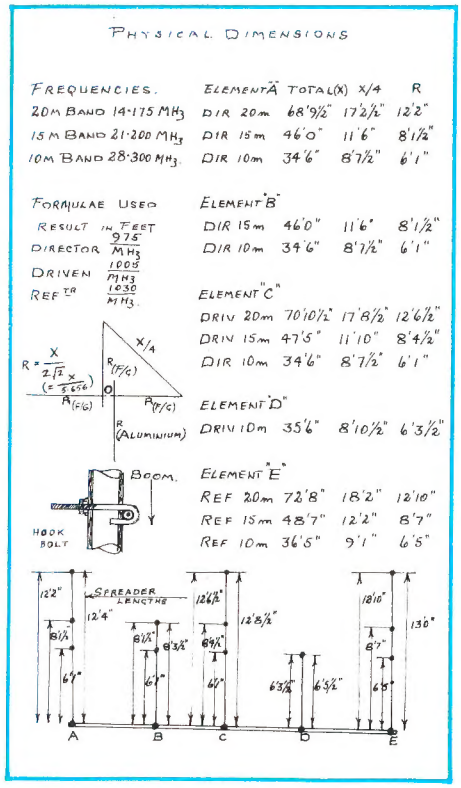
All the joints (at the centre of the horizontal fibreglass and its stiffening peg, all fibreglass rods into the middle tubes, and the splice to the outer ends of the 14 MHz spreaders) were sealed with polyester resin, as used for fibreglass sheeting. The longest spreaders required a joint, with a peg stiffener inside the tube, as the greatest length of fibreglass of this size and especially made, is 12 ft. (3.66m) and the longest spreader is 13 ft. plus the 6 in. vertical through the boom, and down into the lower aluminium dropper (total 4.18m). This splice was at the point farthest from the boom, where bending moment is least. Many glues were tested to breaking point, some being highly recommended well known brands, but none nearly approached the fibreglass emulsion.

The whole beam was capable of being rotated, in its ground position, to facilitate the wiring up and this is shown in a photograph below. Two 2 in. (50 mm) galvanised

pipes 16 ft. (5m) long were driven into the ground to a depth of 2 ft. 6 in. (0.8m) and side guyed with rope. An end brace is shown. It is 3 in. x 1 in. timber (75 x 25 mm) lashed with rope to the 2 in. pipe, and nailed to a peg driven into the lawn. It is just above the garden seat in the next photo. At the top of the pipe a fitting was made, similar to a large boat rowlock, of ⅜ in. (10 mm) mild steel and over this was sleeved ½ in. (12 mm) plastic garden hose. The photograph shows the whole ready to wire up. The bending of the horizontal spreaders disappeared with the wiring in place.

It seems that most quad failures are caused by the wire elements failing at their support points. Much thought was given to eliminating this possibility, and it was decided to sleeve and stiffen the wire for 3 in. (75 mm) each side of each support point. Firstly, the stretched wire was cut exactly 12 in. (300 mm) longer than the required design length. This was so that after completion, the terminal was exactly 6 in. (150 mm) in from the end of the wire and this was an overall length check. The wire length is fairly critical. The points of support were carefully marked off, to the table given later, and each was sleeved, with the support point exactly in the centre of a 6 in. (150 mm) length of fairly hard ¼ in. (6.4 mm) outside and ⅛ in. (3.2 mm) inside plastic sleeving. At the terminal ends, a 3 in. length of the sleeving was put loosely on the wire and away from the terminal point. The sleeves were glued on solidly, with Japanese instant miracle glue produced by Selleys. At each end the 3 in. sleeve, not glued, was temporarily moved a foot or so away from the terminal blocks. The centres of the 6 in. glued sleeves were at the exact supporting points, spaced by quarter of the "total" wire length in the Table.

The supports were 3/16 in. (5 mm) stainless steel "home-brewed" hook bolts, one leg of the hook, the longer, being 2¼ in. (56 mm) threaded 1¼ in. (32 mm) and the shorter leg was 9/16 in. (14 mm). The length of the thread is in order to remove the hook from one of the two 7/32 in. (5.5 mm) holes in the spreader and still leave the nut in place, whilst the sleeved wire was fitted. Pairs of holes drilled through the fibreglass tubes attached the hook bolts, the hole nearest the boom being through only one wall. These two 7/32 in. (5.5 mm) holes were 7/16 in. (12 mm) apart to take the 3/16 in. (5 mm) unevenly legged U-bolt, as sketched.

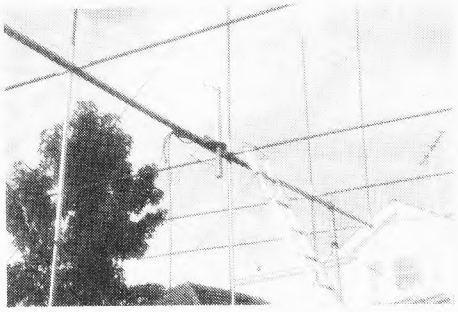


To wire up the elements, a scaffold was rigged near the centre boom splice, and the whole was capable of being rotated, so that all work on the wire was thus at ground level. Firstly one end of an inner, 28 MHz, wire was temporarily fastened at its extreme end to the terminal block on the cold side, and the whole rotated until the first sleeve on the wire was centred at the first hook bolt. The nut was unscrewed unitl the shorter leg of the hook bolt

cleared the spreader, and the sleeved wire could be fitted centrally in the hook. The hook bolt was then tightened and the wire clamped with its glued sleeve bent, not sharply, 90°. Locknuts were used on the hook bolts. Then to the next, which is the upper vertical spreader, and so on around each quad, until all was completed. The total wire length was approximately 600 ft. (180m). The wires, hand-tight only, were checked for length. The bolt-holes in the solder lugs at the terminals should be 6 in. (150 mm) in from the ends, prior to cutting off the surplus. The same applies to the parasitic elements, except that the junction block and bolts are replaced by a single 3/16 in. bolt shorting the element through the aluminium dropper. These also had lock nuts.

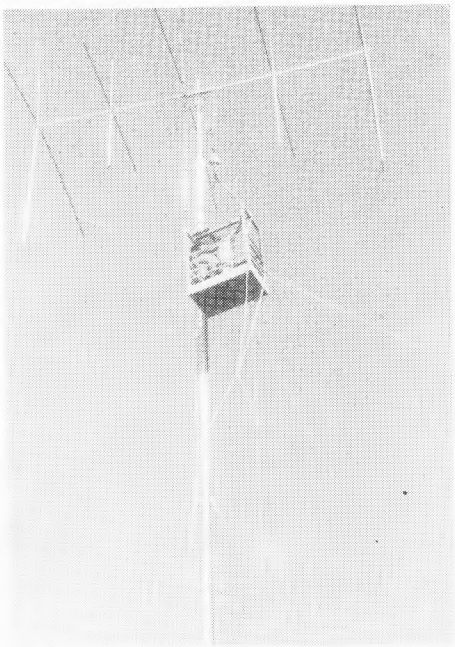
The fastening between the closed ends of the parasitic element solder lugs, and the connection from the driven element solder lugs to the coax were then soldered, as well as the lugs being bolted tightly together. Lastly the loose 3 in. sleeve on the wire was moved close to the lug at the terminal block, after coating the wire with Selleys glue. And you have to be quick, as it sets in seconds!

Finally, the junction blocks, the U-bolts at the spreaders, and the bolts to the closed elements, out to the ends of the plastic sleeves, were coated with three coats of the fibreglass resin and fixer. This eliminates sharp bending at the corners where the wires are fastened. Two more photographs show the unit wired up and ready to go. Note the feed line from the exciter in the "shack". This was used to check the SWR on all bands before erection on the mast.



ERECTION

The total weight of the unit including the ⅜ in. (10 mm) wrought iron boom splice plate, the 2 in. GWI rotating pipe and the ⅜ in. stainless steel U-bolts is very close to 170 lbs. (75 kg). It was erected by a 100 ft. (30m) fly jib steel erector mobile crane, the beam being lashed to the side of a dogman's work box. A photograph shows this box coming down. A Ham M2 rotator was taken down when the earlier beam, a TH6DXX, was removed.



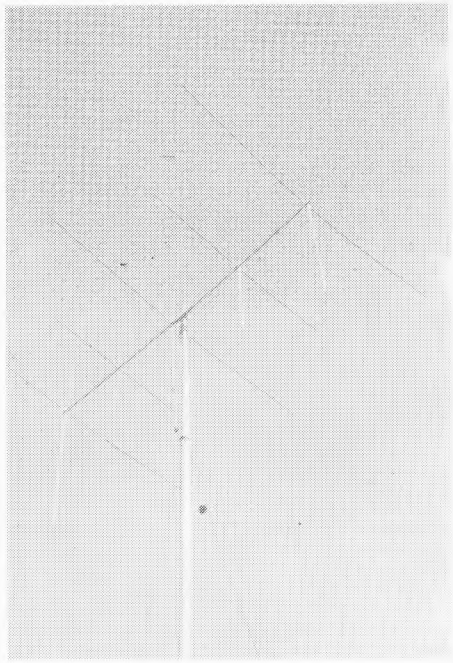
The mast height was reduced 3 ft. (1m) and the guys lowered to 13 ft. (4m) from the base of the rotator, in order that the vertical driven element aluminium dropper for 15 and 20 metres could rotate near the mast. The 10 metre driven element is separate.

The Emotator rotator has two ⅜ in. U-bolts working in slots in the aluminium blocks clamping the stub mast at the centre of the boom. Warning was received that, in tightening, the U-bolts simply spread and left the slots in the block. This was confirmed on the ground, so two ⅛ in. (3 mm) stainless steel plates, shown in the photograph, were made prior to lifting the beam. These were drilled to take the U-bolts and to prevent their spreading. It would be extremely awkward to meet with this problem 75 ft. (23m) up, with the beam lashed to the work box. My thanks to VK3ABE.

The mast is of 6 in. (150 mm) diameter boiler tube, 66 ft. (20m) long, with 6 ft. (2m) of 3 in. (75 mm) tube above, and on a concrete base, which is 2 ft. (0.6m) above the ground. With the rotator, the boom is very close to 75 ft. (23m) above the ground. The beam was balanced by supporting it in the centre of the boom junction and loading the light end by slipping eight sticks of solder inside, covered with Araldite two-part glue.

The heaviest wind the quad has suffered to date is in the vicinity of 50 m.p.h. (80 k.m.h.) and the fibreglass tubes bent somewhat less than the accepted figure of between 7½ per cent and 10 per cent of their length. This, in the longer ones, is approximately 12 in. (300 mm). It is doubtful if they bent even half of this. The aluminium dropper spreaders were more rigid than the fibreglass.

The feed is by three separate lines of RG8AU coax switched in the "shack" some 150 ft. (45m) away from the base of the mast. The coax is connected directly to the full wave element wires, and neither the driven elements, or the parasitics, are tuned in any way, other than the ground tests mentioned earlier. The final photograph is of the completed article.



PERFORMANCE

The electrical or RF characteristics are given in the table and discussed as follows:—

The formulae given by William Hood were accepted as correct, only because he said that they were. The director 975/MHz equals the length of the wire in feet. The driven element 1005/MHz and reflector 1030/MHz.

The result from these formulae varied somewhat from the dimensions given in the latest ARRL handbook, page 29-23. Then again so did the designed resonant frequencies. This antenna is theoretically resonant on the 20 metre band at 14.175 MHz, the 15 metre band at 21.200 MHz and the 10 metre band at 28.300 MHz. It has been stated by Jake K2GAT that the resonant frequency moves approximately 25 kHz in lifting, which height is assumed as being 50 ft or 0.5 kHz per foot. He did not say which way this move was, but I found no resonant point sharp enough to confirm or disprove this assertion. The SWR readings on the ground were very similar to those 75 ft. up.

A variation to this was found on the 15 band, and later, but before erection, the driven element on 15 metres was reduced somewhat. It would seem to me that the driven element formula would be nearer 1000/MHz on this band only. This may be due to a capacitative effect on the 15

metre driven element as it is in between, and parallel to, the 20 metre and 10 metre wires. My driven element was shortened by 5 in. to 47 ft. The parasitic elements were not touched.

The SWR is very low on all bands. On 20 metres it is flat until 14.3 MHz, when it rises sharply to 1 : 1.3 at 14.35 MHz.

On 15 metres it is flat right through, not at 1 : 1.0, but about 1 : 1.2 constant across the band.

On 10 metres it is flat on the low end of 28 MHz and gradually rises to 1 : 1.6 at 28.450 MHz. It may be that the 20 metres and 10 metres elements could be reduced similarly to the 15 metre elements, as in both cases the SWR is good at the low end of the band, but worse at the high end. All of the SWR can be tuned out with the MN200 Drake antenna coupler which is in use, but not necessary.

The hoped for front to back ratio was put near 25 dB, and here results were much better. My good friend in WA, Tom VK6MK, gave me 30 dB. I know his instruments are good, and his meter is on a Collins S Line Receiver, 75S3B. John W4DPI was very careful to record the readings around the full 360°, and his verdict was 36 dB.

Reports over a month now have been better than expected, and many comparisons have led to the conclusion that the results achieved are as good as one could expect, perhaps better.

TVI

Lastly, regarding TVI, the quad has been tested by attenuating the signal of Channel 2 to 70 microvolts, at which point snow was very noticeable. TVI was only slight with the 30 L1 linear running, and none was apparent with a Collins KWM 380 barefoot. This was a vast improvement, in the fringe area of operation, over the trapped tri-bander. Tests were 62 miles (100 km) from the TV transmitter antenna.

The conclusion here is that trapped elements produce more TVI in fringe areas than full size mono band elements. (Particularly quads with no high-voltage end points.—Tech. Ed.) The check was on Channel 2 with 15 metre output, which placed the third harmonic of the transmitted signal inside the TV channel. ■

King of the Hill

John G. Troster W6ISQ
Reprinted by arrangement from "QST", Dec. 1980

ANYTHING YOU CAN DO I CAN DO BETTER . . . WITH LESS

"Hey Charlie, what kinda report you just get from that BZ3?"

"He gimme a 5 9 + 47 dB. What he give you?"

"Hmmmm . . . 5 9 plus . . . ahhh . . . 43 dB over. But, I'm only runnin' the little seven-element beam and it's only up 135 feet."

"Oh yeah! So I beat ya by 4 dB. Hah! And I only got my little four-element multibander at 57 feet."

"Well, actually I see I throwd the wrong antenna switch here. Guess I's only using my old rusty dipole layin' on the roof."

"QRX one . . . ahhh . . . my, my I see I'm transmitten' into a dummy load. It's amazing how good I get out with no good radiator."

"Hold it . . . look here, Charlie, the antenna wire from the final is mis-hooked up to ground! Gotta speak to Old Marge about foolin' with the wires around here."

"I say . . . I just noticed my final ain't turned on . . ."

"Hmmmmm . . . can't believe it, but Old Marge must of tore out the power lines too, "cause all I got operatin' is the oscillator workin' off a dry cell. I get out pretty good for a QRPer with a hunnerdth of a watt and no antenna . . . huh?"

"Come oooonnnn . . . I got a better signal anytime and with any power you want to play with."

"Oh yeah! Listen Charlie, I could comb my hair over my antenna tuner and beat your best rig and antenna . . . anywhere."

"Well, you got more hair than I do. Listen if I wanted to whip you, I could just throw on a little dipole and turn on my exciter . . . like this . . . beat that!"

"Oh yeah . . . I'll blast your little whistler . . . with a flip of the switch on the driver . . . and when I get this antenna screwed back in the right socket . . ."

"No way . . . If I ever turned on my final and hooked up the old sixstack of beams, I'd melt every receiver out there at them antipodes."

"Look, Charlie . . . one snap of the switch here and my Doomsday Final comes on that destroys the ionosphere. So don't fool around. You don't want to be responsible for me meltin' all them ions up there."

"Ahhhhh . . . QRX . . . I hear that BZ3 again. All right, crank up everything ya got . . . pour it on . . . your best shot . . . and I'll show ya who's got the best ether agitator."

"BZ3 . . . BZ3 . . . how ya copy my terrific signal now? Hear that, Charlie? . . . he gimme a S9 + 48 dB. That's one dB better than you got last time. Go ahead. Try your miserable rig."

"BZ3 . . . BZ3 . . . how much louder is my rf bomb than ISQ's? Ahhhh . . . you say . . . ahhh . . . only 46 dB over? Ahhhh . . . let me look here . . . see what I forgot to hook back up."

"Nothin' you forgot to hook up. Admit it. You got a pile of junk over there. I just beat ya . . . seeee . . . I beat ya by 2 dB . . . errr . . . this time."

"Oh yeeeeaahhhh . . . well, no wonder . . . your mountain is higher than mine by 33 feet. Half a wavelength and that's important."

"Year, but that means I gotta transmit my rf through all that more fog and rain that I get up here at this higher elevation. That soaks up rf in the worst way, ya know."

"Well naturally you're gonna beat me by 2 dB this time of day because the long-path skip has already gone by me and now you got the best skip. Wait till the skip evens out and I'll blast out some rf that'll neutralize anything you can . . ."

"Wait a minute . . . from your mountain you got a better shot out across the whole wide Pacific Ocean. I only got little old San Francisco Bay to bounce offen. It ain't as salty as the ocean neither."

"Well, I'll be . . . lookie here. Looks like I'm only usin' that dadratted little old four-element multibander again. No wonder I'm down 2 dB."

"Ohhhhh . . . what do ya know . . . my switch . . . guess I must of forgot to throw it back on. I see I'm still only using my little dinky old rusty dipole on the roof."

"For goodness sakes . . . look what I forgot to hook up . . ." ■

Vicom International Pty. Ltd.
57 City Road
South Melbourne
Victoria. 3205
Phone (03) 62 6931

339 Pacific Hwy.
Crows Nest NSW
2065
Phone (02) 436 2766

Authorised Dealers
N.S.W.
Newcastle: Elektron 2000 26 2644
Wagga: Rivercom 21 2125
W'Gong: Macalec 291455

Queensland
Brisbane: CW Electronics 397 0808
Cairns: GCG Communications 541035
Gold Coast: Amateur's Paradise 32 2644
Townsville: Robco Equipment 72 2633

Victoria
Melbourne: Eastern Communications 288 3107
Moe: Codlin Communications 27 4516
Hamilton: Hamilton Electronics 72 3333
Ballarat: Wecam 39 2808

South Australia
Adelaide: Compucom 43 7981
I C S 47 3688
Mt. Gambier: Set Services 25 2228

Western Australia
Perth: Willis Electronics 21 7609
Netronics 46 3232
Kalgoorlie: Hocks TV 21 1906

Tasmania
Launceston: Gelston 44 3882
Advanced Electronics 31 7075
Hobart: Harvey Skegg 47 6674
Burnie: VK Electronics 31 1708

VICOM

The world of Vicom

Vicom actively sources the latest products from overseas by Vicom's staff have genuine product interest and product centres, and its products carry a one year warranty.

IC-2A and accessories.

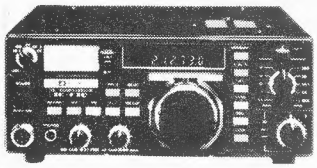
- More compact than the others (800 channels in palm of your hand).
- More accessories than the others.
- Icom technical excellence.
- 12 months warranty from Vicom.
- Full service and test facilities at Vicom.
- All products checked before despatch at Vicom.

ICOM

IC2A
ICOM 2M FM mobile transceiver, 25 watts (Spare) $279.00
ICBP2
ICOM Nicad pack 6xAA large size $39.00
ICBP3
ICOM IC2A standard Nicad pack $29.00
ICBP4
ICOM battery case (dry cells) for IC2A **$10.00**
ICBP5
ICOM Nicad pack for 2.3 watts output $59.00
ICDC1
ICOM DC converter for IC2A $20.00
ICHM9
ICOM speaker/mic for IC2A $25.00
ICLC3
ICOM case cover for IC2A $8.80
ICFA2
ICOM rubber antenna for IC2A (Spare) $13.00
ICCP1
ICOM vehicle charging lead for IC2A $6.50
ICBC30
ICOM quick charge unit for IC2A $69.00
ICML1
ICOM 2M linear amp 2W, 1W, 10W output $99.00

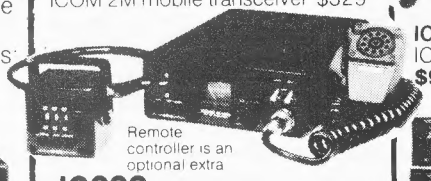
ICOM TRANSCEIVERS

IC730
Transmission in SSB and AM mode; twin VFO's; memory function; tuneable in 1kHz, 100Hz and 10Hz steps with a dial-lock feature; adjustable power output on sideband; 100 watts output on all mains; dual time constant noise blanker switch. **$899**



IC720A
Icom's deluxe HF transceiver-for the amateur with an eye for technical excellence. Using the latest technology, this fine transceiver is ideal as a base station. And your new IC720A comes complete with a VICOM 12 months warranty too. $1349

IC22U
ICOM 2M mobile transceiver $329



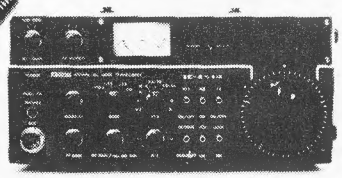
Remote controller is an optional extra

IC22S
Australia's best selling 2m Rig. Over 4600 sold in Australia.
$299

ICOM

IC251A
ICOM 2M all mode transceiver $769

IC451A
ICOM 70CM transceiver AC/DC **$939**



ICOM ACCESSORIES

IC2KL
ICOM solid-state linear amplifier 1KW $1599

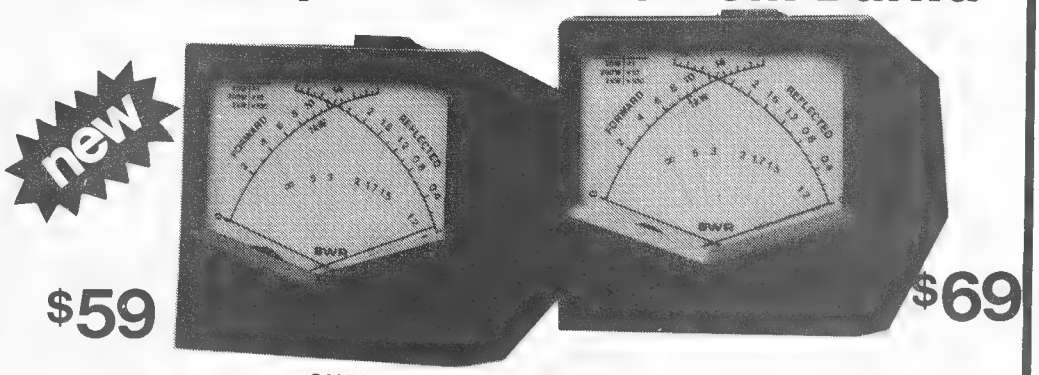
IC551D
ICOM 6M transceiver excl FM/PBT/VOX $789

ICHM10
ICOM up/dwn scan mic. for 25A/260/255 $45

brings the world to you.

representing Icom, Daiwa, Regency, Jaybeam, Tono and others. understanding. Vicom has one of the best equipped service and repair

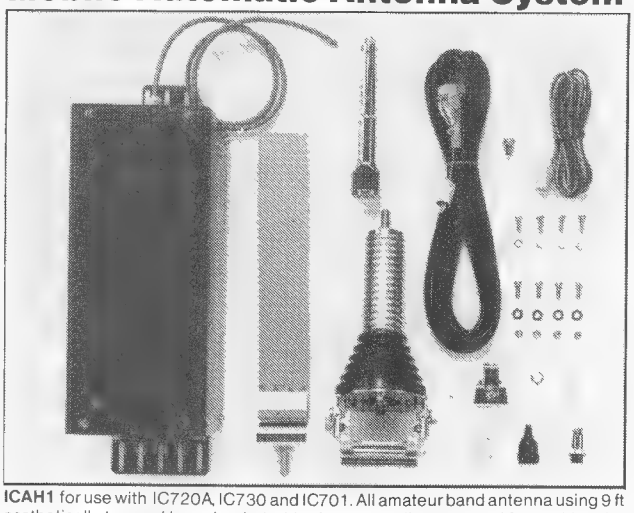
New SWR/PWR Meters from Daiwa



	CN520	CN550
Frequency:	1.8-60MHz	144-250MHz
Power Range:	FWD: 200/2kW Ref 40/400W	20/200W 4/40W
Impedance:	50ohm	50ohm
Meter Accuracy:	± 10% at full scale	± 10% at full scale
Connectors:	S0-239	S0-239
Dimensions:	72W x 72H x 95D m/m	72W x 72H x 95D m/m

DAIWA

Mobile Automatic Antenna System

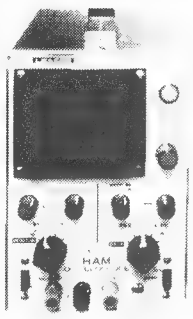


ICAH1 for use with IC720A, IC730 and IC701. All amateur band antenna using 9 ft aesthetically tapered base-loaded whip. Automatically resonated from within the case by the touch of a button.

ICOM $249

LBO310HAM

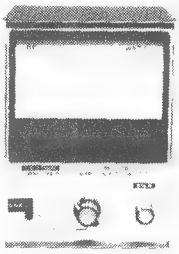
Ideal as a general CRO for the shack. Also doubles as a monitorscope to check your transmitted signal. Sensitivity 20mV, bandwidth 4MHz, screen 3".
$339



T-25
VICOM dummy load 3 5-500Mhz 25WCONT $16

OTHER ACCESSORIES

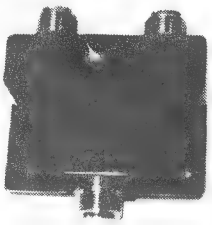
LDM815
LEADER dip meter $99
LPM885
LEADER SWR/Watt meter $102



RM940
DAIWA infrared mobile mic $139
VM-1
VICOM noise-cancelling mic, low 2 $16
LA31
LEADER nam scope adapter $31

COAX RELAYS AND SWITCHES

CS201
Quality 2 position switch.
$24



CS401
DAIWA coaxial switch 4 positions $69
CX120P
VICOM coax relay 150W, to 2 5GHZ 12V DC $24
CX230
VICOM coax relay 300W 1 5GHZ, 12V DC $43

MORSE KEYS

EK121
KATSUMI electronic keyer with dot memory $72
EK150
KATSUMI electronic keyer $143
HK706
Morse key, operator's model $23
HK708
Morse key, economy $22
MK1024
KATSUMI electronic keyer programmable $235
MK701
Morse paddle, side-swiper $53

ANTENNAS/ ACCESSORIES

AS-203W
ASAHI full size 20m beam 2 el (2 only) $237
AS-NK
ASAHI bumper mount kit $26
BM-1
HUSTLER universal bumper mount $28
FD30LS
DAIWA low pass filter 32MHz Fc 200W $25
LDS-1
MARK light duty antenna spring $10
RM40
HUSTLER 40m resonator antenna $30
10Y/2M
JAYBEAM 10 el, 11 4dBd 2 metre beam $96
5Y/2M
JAYBEAM antenna 5 el, 7 8dBd 2 metres $43
VAB/2/10
VICOM beam antenna 2m, 10 el 12dB gain (3) $83
VAB/2/5
VICOM 2B beam 2M, 5 el, 8dB gain, 500W $39
VAB/70/16 VICOM 16 el LP/YAGI, 70cm antenna (incl balun) $65
VAW/2/5
VICOM 5/8 f-glass whip tuned 146 5MHz $13
VAW/2/B
VICOM beiling-ee base $4
V4JR
NAGARA 40-10M trap vertical antenna $115

QRP CW Transmitter with Break-In – Part 1

Drew Diamond VK3XU
43 Boyana Cres., Croydon, 3136

This transmitter is for the keen Morse enthusiast. The CW portions of the most popular bands are covered and break-in operation is provided. The operator has only to start sending to place a signal on air. Whilst sending, the receiver is enabled between letters and words, so the operator immediately becomes aware of any breaker or interference. Needless sending is avoided when unsuccessful in replying to a CQ, as the station receiver continuously monitors the channel. The output power is sufficient to drive previously described amplifiers. No esoteric or special components are required, and all the parts are readily available at present.

PERFORMANCE

Bands: 1.750 to 1.812, 3.500 to 3.625, 7.000 to 7.250 and 14.0 to 14.5 MHz.

Output Power: At least 1.5W, typically 2W into 50 ohms.

Spectral Purity: Harmonically related signals at least —42 dBc, non-harmonically related signals —50dBc.

Amplitude Noise: At least —60 dBc in a 3 kHz bandwidth.

Frequency Stability: Less than 100 Hz/hour drift after one hour warm-up on 14 MHz. Improves by a factor of ½ for each sub-multiple.

This performance is accomplished with one oscillator (no mixers, multipliers or phase-locked loops) and digital dividers followed by simple low-pass filters. Operation from external 13V supply is possible.

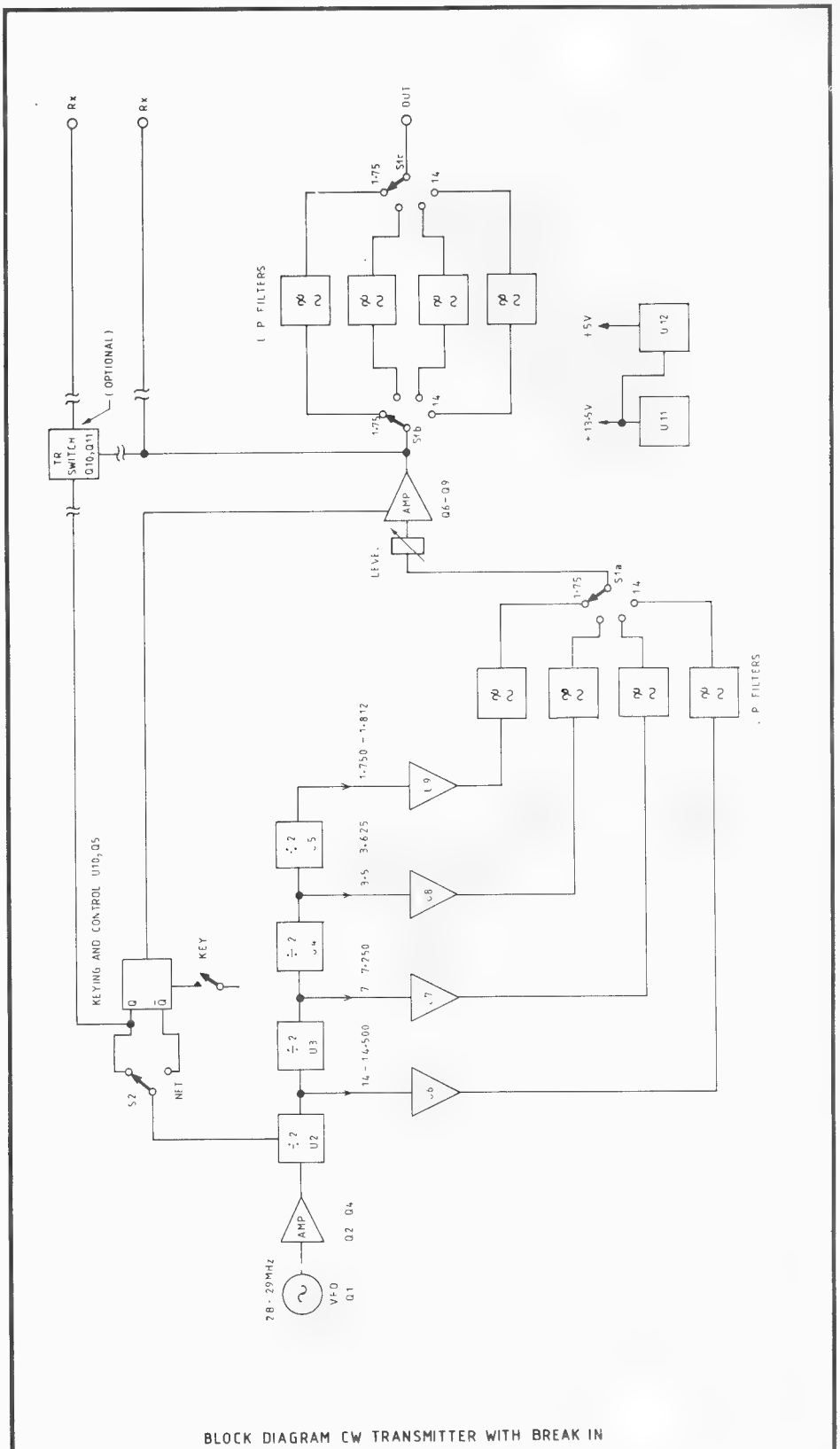
BLOCK DIAGRAM

The VFO is tunable from 28 to 29 MHz and is followed by an amplifier with sufficient voltage output to drive a TTL gate. During sending, U2 through U5 each divide their respective inputs by two, and so produced the frequencies indicated. U6 through U9 buffer the dividers, and drive the four low-pass filters. The frequency band selected by S1a is applied to the output amplifier via a level control. The amplified signal is routed via an appropriate LPF to remove any harmonics produced by the output amplifier.

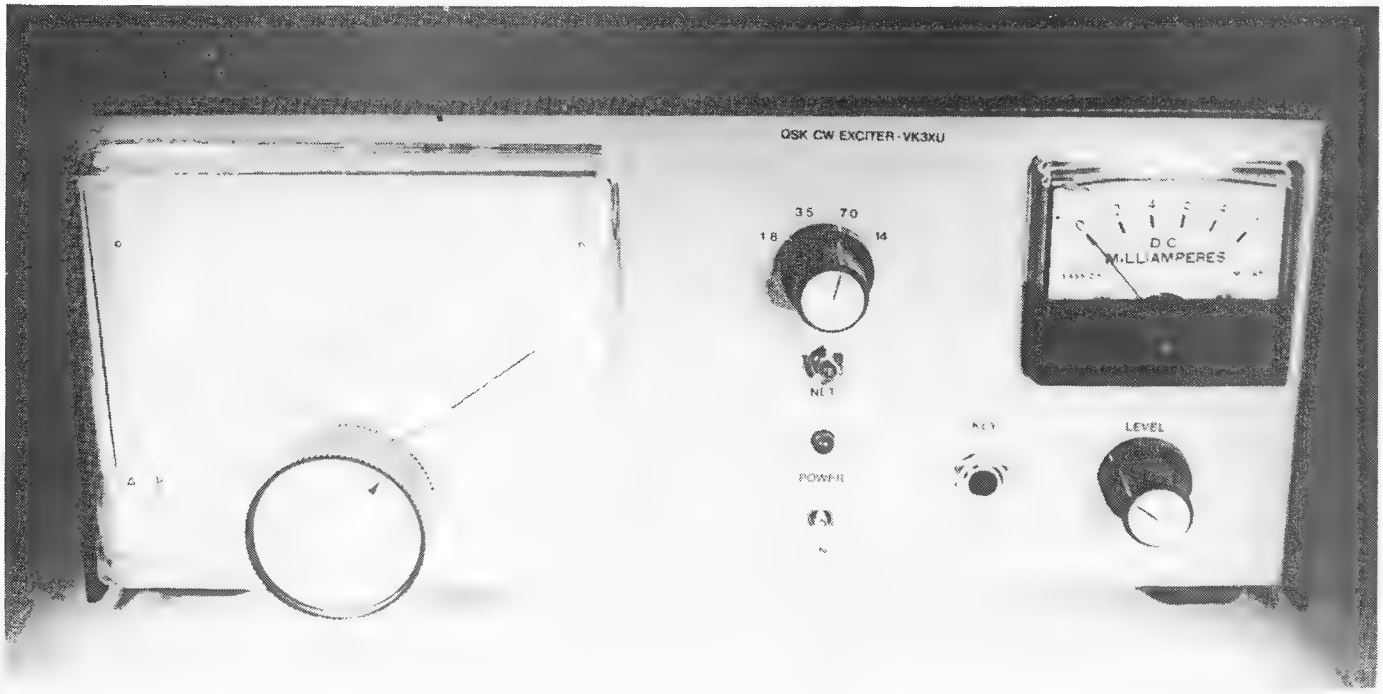
Keying is implemented with a retriggerable monostable multivibrator U10. Each time the key line is pulled low, the Q output goes high for a predetermined period set by the delay control (generally about ½ second). This high enables the dividers to operate. At the end of the delay period, the divider chain stops operating. As it is impossible for "sub-harmonics" to occur, no locally generated signal is heard during listen periods, thus allowing the VFO to run continuously. The other output from the keying circuit turns the early stages of the output amplifier on and off in a shaped fashion to form the dots and dashes from the hand keyer, keyer or keyboard.

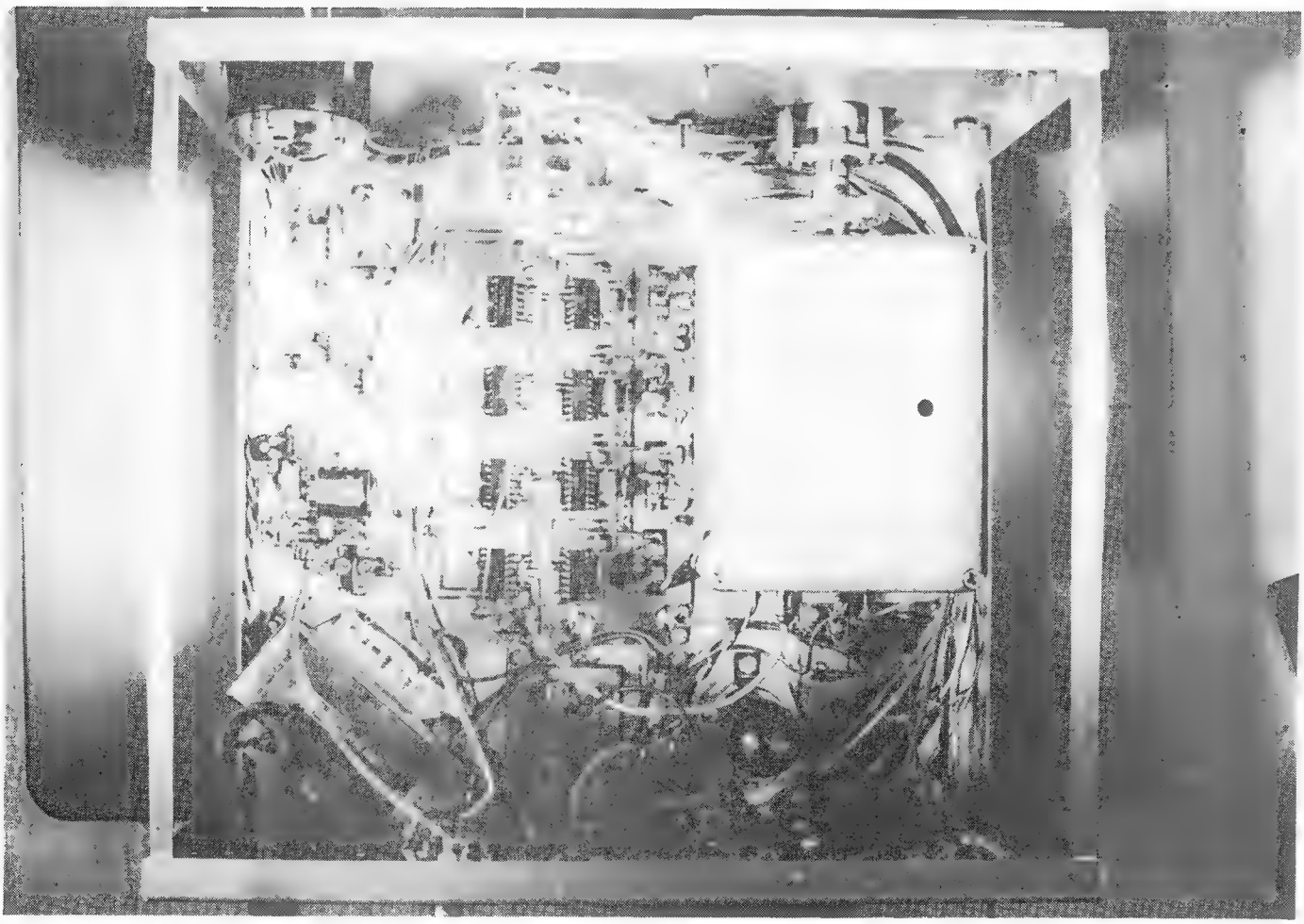
Regulated supplies of +13.5V for analogue circuits, and +5V for digital circuits are provided by U11 and U12.

Circuit description and diagrams in Part 2.



BLOCK DIAGRAM CW TRANSMITTER WITH BREAK IN


QSK CW EXCITER - VK3XU
3.5
7.0
1.8
14
NET
POWER
KEY
LEVEL
D.C.
MILLIAMPERES



A New Frequency Counter — Update

Based on information supplied by
W. Beyer VK3BHW.

This is a follow-up on the article "A New Frequency Counter" published in AR January 1981. The basic information was extracted from an article by E. H. T. Van der Heyden PA0EHT, published in "Electron" March 1981. This counter has excellent performance, however a VHF prescaler as described here extends the frequency coverage up to 1 GHz.

CIRCUIT DESCRIPTION

The input is protected by two diodes connected back-to-back.

The input amplifier proper is an OM336 hybrid technology broadband amplifier, suitable in the range from 40 MHz to 860 MHz, and it is possible to extend the range to 1 GHz with careful design, thus we have plenty of margin in this application. The input amplifier is followed by the Plessey SP8631A high speed divider, as the prescaler. The BC178 transforms the output of the SP8631A to TTL level.

Some care should be taken with the amplitude of the input signal and it is recommended that the input signal be limited to a maximum of 1 volt with an external attenuator.

Supply voltage for the SP8631A is 5V DC and the OM336 requires a higher voltage to a maximum of 24V DC. Thus 16V DC is taken direct from the rectifier (see modified power supply circuit), and is switched by the BD136 which in turn is switched on by the BC107 when required; the amplifier and prescaler only receive their respective supply voltage when the counter is switched to the 500 MHz range.

The zener diode at the supply pin of the OM336 is purely for over voltage protection.

Parts list for 500 MHz input amplifier/prescaler:—

ICs: 1 IC8361A (Plessey), 1 OM336 broadband amplifier (Philips).

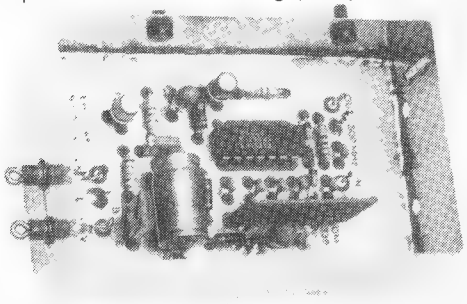
Transistors: 1 BD136, 1 BC178, 1 BC107.

Diodes: 2 HP5082-2800 or 1N4148, 1 zener diode 24V 250 mV.

Resistors: 1 10 ohm 1/8W, 2 217 ohm 1/8W, 1 270 ohm 1/8W, 1 1.2 k-ohm 1/8W, 1 4.7 k-ohm 1/8W.

Capacitors: 7 1 nF ceramic, 1 100 nF ceramic, 2 10 uF 25V tantalum, 1 100 uF 25V, 2 lead-through capacitors 1 nF.

Miscellaneous: 7 1 mm PC board pins, 1 piece of tin for screening (see photo). ■



500 MHz Prescaler.

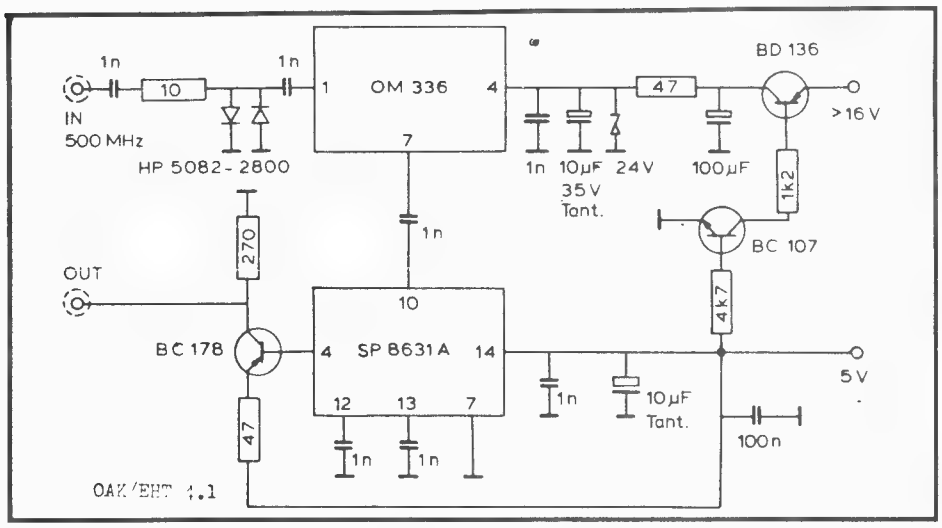


FIG. 1: 500 MHz Prescaler.

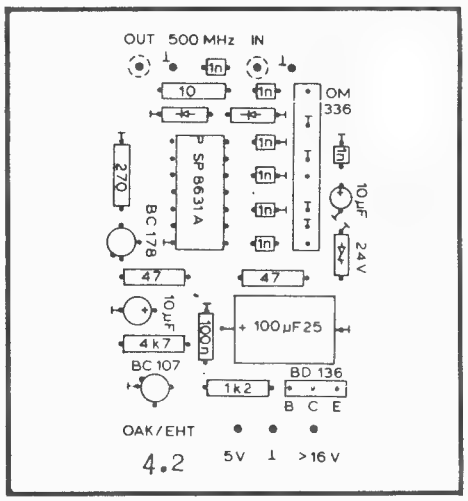


FIG. 2: Component Layout for Prescaler.

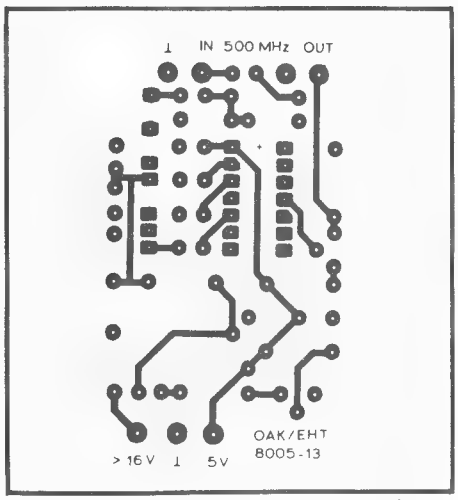


FIG. 3: PCB Layout for Prescaler.

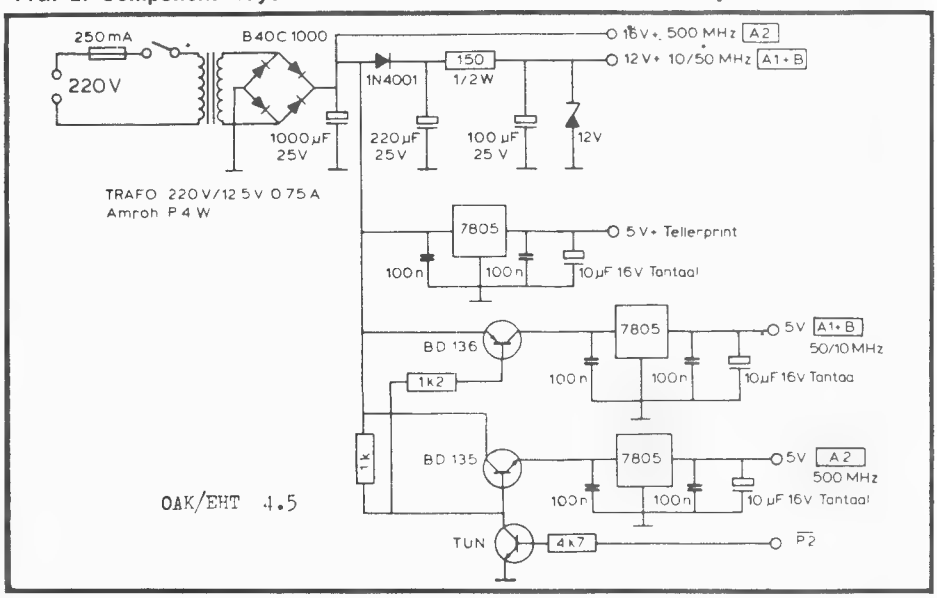
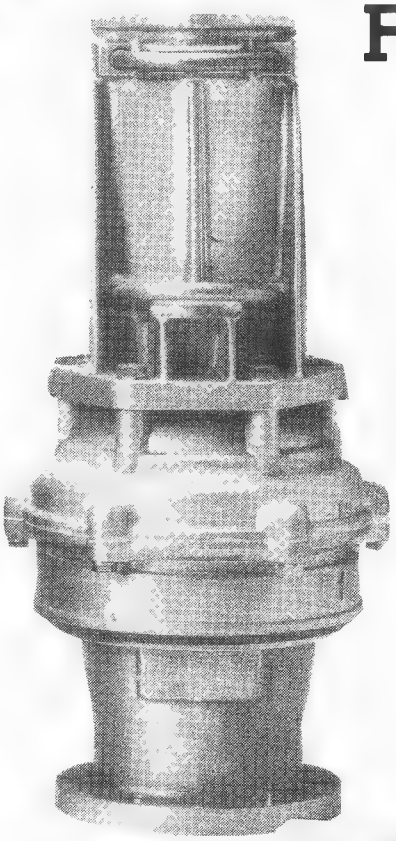
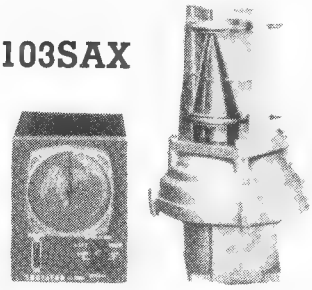


FIG. 4: Modified Power Circuit.

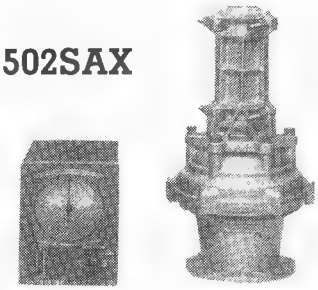
EMOTATOR ROTATORS FROM BAIL



103SAX

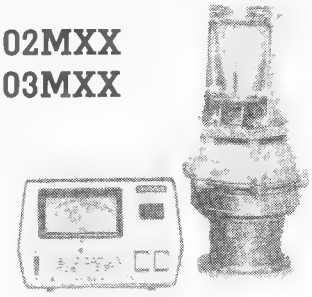


502SAX



SAX MODELS HAVE GREAT CIRCLE MAP CENTRED ON S.E. AUSTRALIA

1102MXX
1103MXX



Controller for
1102MSAX, 1103MSAX

Model	A M^2	GD^2 $Kg M^2$	Braking Torque Kg Cm	Rotation Torque Kg Cm	Vertical Load Kg
103SAX	0 7	75	1500	450	150
502SAX	1 5	130	4000	600	400
1102MXX MSAX	2 5	300	10 000	800	400
1103MXX MSAX	2 5	700	10 000	1000	400

A: Allowable Antenna wind area
GD^2: Allowable Flywheel effect

CONTACT THE AUSTRALIAN AGENTS FOR EMOTATORS AND ALL ROTATOR ACCESSORIES . . .

BAIL ELECTRONIC SERVICES

38 FAITHFUL STREET, WANGARATTA 3677
Telephone: (057) 21 6260 — Telex: 56880
DISTRIBUTORS AND AGENTS IN ALL STATES

Stan Roberts
VK3BSR

AR SPECIAL
Planning for Australia's Domestic Satellite System

In July 1980 the Satellite Project Office of the (then) Postal and Telecommunications Department in Canberra issued an Information Paper entitled "Planning for a National Communications Satellite System". This was followed in October by the issue of a vast mass of tender data.

Many amateurs will be interested in reading extracts from the Information Paper relevant to the general principles involved, published with permission of OTC. A general article on the subject appeared in OTC's magazine "Contact" of March 1981.

BACKGROUND

In October 1979, the Minister for Post and Telecommunications announced the Government's decision-in-principle that it would be in the national interest to establish a communications satellite system for Australia. At that time, the Minister also announced that a Satellite Project Office would be established within the Postal and Telecommunications Department to set in train the planning activities necessary for the introduction of the system.

The SPO has been operational within the Department since the end of 1979, progressively drawing on resources and expertise of OTC (A), Telecom, the ABC, the Department of Transport and the Department itself. Considerable use has also been made of two leading international consultants: the COMSAT Corporation of the USA and the European Space Agency (ESA).

TECHNICAL ASPECTS OF SATELLITE SYSTEM

A basic communications satellite system usually consists of two satellites in orbit — one a working satellite and a second spare satellite to take over immediately if the prime satellite fails. In addition a further spare satellite is normally held on the ground. A spare satellite in orbit is required because even with a satellite available on the ground, at least 3-4 months are needed to arrange for launch, positioning in orbit, and testing of a satellite.

Among the different orbits originally proposed for communications satellites, only the so-called geostationary orbit has withstood the test of time. This is a circular orbit above the equator in which the satellite circles the earth every 24 hours at an altitude of approximately 36,000 km. In view of the earth's own 24 hour rotation, a satellite placed at this altitude and moving from west to east, will appear stationary to an antenna placed on the earth.

As in many other areas of technological innovation, constraints are imposed by available resources. In the case of the satellite system the available frequency spectrum is limited in bandwidth. Care must therefore be exercised in implementing satellite systems to ensure that electrical interference does not occur between neighbouring systems nor between satellites and earth stations, and terrestrial microwave systems.

Because of the potential for interference between neighbouring satellite systems, the allocation of positions in the geostationary orbit is becoming a complex technical and administrative procedure involving extensive international liaison. Furthermore, certain sections of the gyrosynchronous orbit are becoming relatively congested, and it is becoming increasingly difficult to secure orbit locations which are satisfactory for the system, and which can also be satisfactorily co-ordinated with other systems.

In view of lunar and planetary gravity fields, solar radiation, as well as variations in the earth gravity field, it is also necessary to control the satellite's altitude and position by means of on-board corrective units.

Since a geostationary spacecraft in fact is an earth satellite, it is carried by the earth around the sun once a year, and periods of earth eclipse therefore occur at regular intervals. During eclipse the earth's shadow falls across the panels of solar-powered cells which normally provide power for the on-board communications equipment. This phenomenon takes place during the two annual equinoxes (early March to mid-April and early September to mid-October) when shadowing occurs for up to a maximum of 65 minutes per day; outside these two periods the satellite would be in 24 hour daily sunlight. In order to prevent a complete communications breakdown during eclipse, communication satellites generally carry on-board rechargeable batteries; in the case of high-powered direct-broadcast type satellites, however, it may not be economical to carry the additional payload required for the heavy batteries; in such a case, it would be necessary to place the satellite at such a longitude that the eclipse occurs outside the daily prime transmission period.

SYSTEM COMPONENTS

The development of satellite systems is a process concerning the inter-dependence of the earth sector, the space segment and the launch in a total transmission system. Each of the three components is described below.

EARTH SECTOR

The typical communications earth station would be located in an electrically quiet area, as close as possible to its associated domestic communications centre. The station would have equipment to transmit signals to the satellite, to receive and process signals from the satellite and to point the large antenna towards the satellite.

The communications equipment consists of a high power transmitter, a sensitive receiver, equipment for combining the communications traffic received from the terrestrial network (multiplex baseband equipment), and radio equipment interfacing the baseband equipment with the transmitter and receiver. The antenna would be aimed at the satellite by mutual setting to the satellite's celestial co-ordinates; it may then be switched to an automatic tracking system that compensates for any slight station movements of the satellite. Small antenna can be permanently fixed in position. The power system for the station generally consists of a reliable source of commercial power, backed up by standby diesel generators; the most vital equipment is often powered by an uninterruptible no-break power supply.

SPACE SEGMENT

Communications satellites consist of a number of subsystems, such as spacecraft structure, control systems, antennae, receivers, transponders and power supply.

When in orbit, a satellite maintains its correct altitude in relation to the earth and its correct location in the equatorial orbit by means of the stabilisation methods described below, augmented by an electronic control system and an auxiliary gas jet propulsion system.

The spin-stabilised satellite uses a gyrostat configuration in which the spinning spacecraft body provides the basic stabilisation. Antennae and electronics would be mounted on a stationary, i.e. de-spun, platform as the antennae must be permanently orientated toward the earth in order to concentrate the radiated energy in that direction. The so-called body-stabilised satellite, on the other hand, stabilises the satellite structure by means of one or more on-board fast spinning momentum wheels.

The process whereby a community of earth stations gain access to one common satellite and establish separate communications paths simultaneously through the satellite is called multiple access. In such a system, the received signals would be separated either in frequency (frequency division multiple access or FDMA) or in time (time division multiple access or TDMA); thus, the signal would be received

at the uplink frequency, amplified, converted to the associated downlink frequency and amplified again in one of a number of transponders to a sufficient power level to sustain the atteuation involved in the long path back to earth.

LAUNCH CONSIDERATION

The US space agency NASA, has two classes of rocket launch vehicle available. The Delta class is capable of placing satellites weighing about 500 kg into synchronous orbit which is adequate for the domestic satellites such as ANIK (Canadian), WESTAR (US) and PALAPA (Indonesian). The typical Atlas Centaur class with 915 kg capacity is more suited to the larger domestic satellites such as COMSTAR and to the INTELSAT series of international satellites.

It should also be noted that Europe is developing Ariane, an expendable vehicle with similar lift capacity to Atlas-Centaur.

Conventional expendable launch vehicles consist of a series of stages coupled together with the first stage engine at the base and the satellite at the apex. The first stage engine is used to lift the assembly off the ground in a ballistic trajectory designed to intersect the equator. The next stage is first fired to achieve an elliptical parking orbit of 186 km apogee and 1800 km perigree. On passing the equator the second stage fires a second time, so as to place the satellite in a larger elliptical (transfer orbit) of 550 km perigree and 35,800 km apogee. At apogee the satellite is at the distance required for circular geostationary orbit and needs only an impulse from a small onboard engine to inject it into that orbit.

Also under development is the NASA manned Space Transportation System (STS or Shuttle) which will be based on a manned low altitude orbital vehicle which will in effect replace the first stage of the rocket launchers. During a shuttle launch the satellite assembly will be carried within the cargo bay of the orbital vehicle until low elliptical orbit is reached. It is then off-loaded and separated from Shuttle. The assembly includes an auxiliary rocket engine to perform the same function as the conventional second stage rocket engine. A so-called SSUS engine (Solid Spinning Upper Stage) is coupled to the satellite for this purpose.

The first commercial use of the Shuttle is planned for the early 1980's, and following this NASA will discontinue the use of conventional expendable launch vehicles. As far as the economics of Shuttle launches is concerned it is still too early to make definitive statements; expect that it seems likely that the Shuttle will have a major impact on future design of satellites, in order that maximum use can be made of multiple spacecraft launchings, a concept which will be closely associated with the Shuttle.

TRACKING, TELEMETRY AND COMMAND

In order to maintain satellites in their correct positions and to ensure that they are functioning correctly, it is necessary to provide a tracking telemetry and command (TT&C) system. In the INTELSAT system this is the responsibility of a worldwide network of special stations. One of these is located at Carnarvon, WA, and is operated by OTC.

SYSTEM DEFINITION

Consultation and system development

Planning and development activity associated with the design of a national communications satellite system has been an iterative process. System definition has evolved progressively, in parallel and interacting with consultative activity on potential service requirements.

Throughout all developmental stages, planning has taken progressive account of updated information on potential service requirements, in the light of cost and technological considerations.

The evolution of system definition has progressed from a conceptual design premised on identification of a range of baseline services.

Space segment

With consultancy assistance from COMSAT (USA) and the European Space Agency, the SPO has developed a specification for the Australian system along the lines outlined below. The basic design assumes the use of up-to-date but space-proven hardware with the obvious objective of minimising technical risk and providing maximum economy. The RFT envisages purchase of three spacecraft (one operational and one spare in orbit and a standby on the ground) with an option to buy a fourth.

Transponder capacity

The satellite will have a capacity of up to 25 transponders per spacecraft. Transponder definitions envisages facilitation of a wide range of modulation techniques at the user's discretion.

Frequency bands

The satellite will operate in the 14.0 - 14.5 GHz frequency band in the uplink and in the 12.25 - 12.75 GHz band in the downlink.

Coverage areas

In the earth to space (uplink) direction the satellite will have a national beam, i.e. it will be capable of receiving signals from anywhere within Australia. Downlink transmissions will be receivable in the following coverage configurations:

- a National beam (illustrated in Appendix C, Annexure 1)
- four spot beams, covering WA, Qld, SA/NT and NSW/Vic/Tas respectively. These beams will be primarily for the HACBSS service, but could also be used for the Fixed Satellite Service (illustrated in Appendix C, Annexures 3 to 6 inclusive)
- possibly a spot beam covering Papua New Guinea.

Operational system design life

The satellite will be designed to operate for at least seven years. It will be provided with ample battery capacity to continue operation during eclipse periods.

Orbital locations

The orbital locations tentatively chosen for the satellite system are 150°E and 164°E, above the equator. Confirmation of these positions will be subject to international co-ordination. Another position set tentatively at 160°E will be selected for a spare satellite in orbit, keeping in mind that the latter could provide some pre-emptible capacity.

The spacecraft

The satellite has been designated as a "D-class spacecraft" capable of being launched on one of three alternative classes of launch vehicles.

Launch vehicles

- Delta class — an expendable launch vehicle developed and marketed by the US National Aeronautics and Space Administration (NASA) and capable of launching one D-class satellite.
- Ariane — an expendable launch vehicle being developed by the European Space Agency (ESA) and approximately capable of launching two satellites of approximately D-class size; and
- Space Transportation System (Shuttle) — a recoverable launch vehicle being developed by NASA and capable of launching a wide range of satellites including the D-class.

Spacecraft control

The request for Tender will also include a requirement for two Tracking, Telemetry Command and Monitoring stations and for a Spacecraft Operations Control Centre which would be associated with one of these stations. It is expected that one TTC & M station would be located somewhere in eastern Australia and the other either in central or in western Australia. The Satellite Control Centre would be capable of exercising full control over the satellite system from Australia.

Earth stations

The National Satellite System is planned to include several classes of earth stations specified in accordance with technical parameters formulated to ensure compatibility between the space and earth segments consistent with international regulatory requirements. The RFT will include specifications for those earth stations having a major impact on system design and/or public sector costs as listed below:

(a) Major city earth stations for multipurpose use;

(b) Transmit/Receive Television and/or Radio earth stations for location at ABC production studios;

(c) Remote Telephone Satellite Services;

  (i) Homestead Telephone earth station (one circuit)

  (ii) Community Telephone earth station (2-12 circuits)

  As options, these stations could provide for reception of HACBSS TV and radio signals, as well as a

conference facility which could be used for School-of-the-Air.

(iii) Emergency Telephone earth stations (2-12 circuits).

(d) Minor Earth Stations (suitable for the School of the Air service, etc.).

(e) Homestead and Community TV and Radio Broadcast Only earth station.

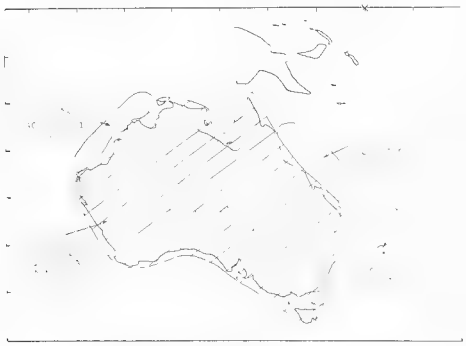
(f) Department of Transport Earth Stations.

(g) Receive only Television and/or Radio Earth Stations for location at ABC provincial television transmitter sites from which the programs will be re-transmitted terrestrially.

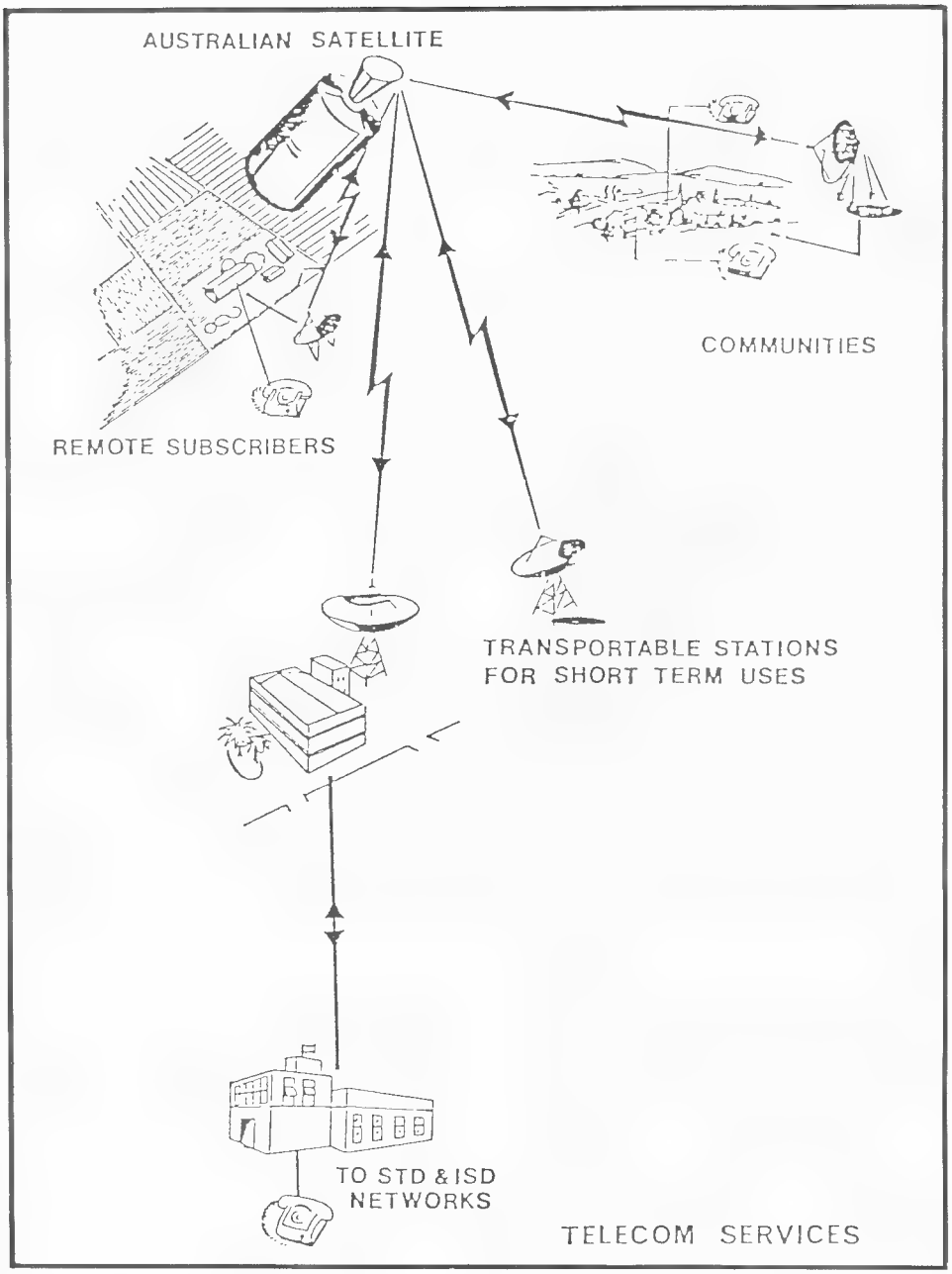
(h) Telecom Transportable Satellite thick route earth station to provide additional major route traffic on a temporary basis.

The HACBSS earth stations will be a pilot purchase for assessment purposes. The Remote Telephony Satellite Service earth station will also be purchased in limited quantities initially, to permit field trials prior to purchasing substantial quantities for general installations.

The Minor Earth Stations will be purchased in limited quantities on a once-only basis to help develop an Australian source for multi-purpose type earth stations. ■



Taken from Appendix C Annexure 1.



The Amateur's Code

ONE
The Amateur is Considerate . . . He never knowingly uses the air in such a way as to lessen the pleasure of others.

TWO
The Amateur is Loyal . . . He offers his loyalty, encouragement and support to his fellow radio amateurs, his local club and to the Wireless Institute of Australia, through which Amateur Radio is represented.

THREE
The Amateur is Progressive . . . He keeps his station abreast of science. It is well-built and efficient. His operating practice is above reproach.

FOUR
The Amateur is Friendly . . . Slow and patient sending when requested, friendly advice and counsel to the beginner, kindly assistance, co-operation and consideration for the interests of others; these are marks of the amateur spirit.

FIVE
The Amateur is Balanced . . . Radio is his hobby. He never allows it to interfere with any of the duties he owes to his home, his job, his school, or his community.

SIX
The Amateur is Patriotic . . . His knowledge and his station are always ready for the service of his country and his community. ■

QSP

FALSE TEETH RFI

According to QST, Feb. '81, ARRL has opposed an aplication to FCC by Clairol Corporation for a waiver of the FCC rules so that the Corporation can market an ultrasonic denture cleaner without having to comply with standards dealing with radio frequency interference. ■

TELEPRINTER CODES

Feb. '81 QST reports that four amateurs have received special temporary authority from the FCC to experiment with a teleprinter code similar to the commercially used "Moore ARQ Code" (described in CCIR Recomendation 476) and to report their findings to the FCC at the end of one year. These amateurs, members of the Amateur Radio Research and Development Corporation (AMRAD), will be trying to develop an error-free mode of amateur teleprinter communications. ■

Regency scanners

...action as it happens

A choice of 3 scanners — for use at home or on the go!

Vicom International Pty. Ltd.

57 City Road
South Melbourne
Victoria, 3205
Phone (03) 62 6931

339 Pacific Hwy
Crows Nest NSW
2065
Phone(02) 436 2766

Authorised Dealers

N.S.W.
Newcastle
Elektron 2000
26 2644
Wagga Rivercom
21 2125
W'Gong Macalec
29 1455

Queensland
Brisbane CW
Electronics
397 0808
Cairns GCG
Communications
54 1035
Gold Coast
Amateur's
Paradise 32 2644
Townsville Robco
Equipment 72 2633

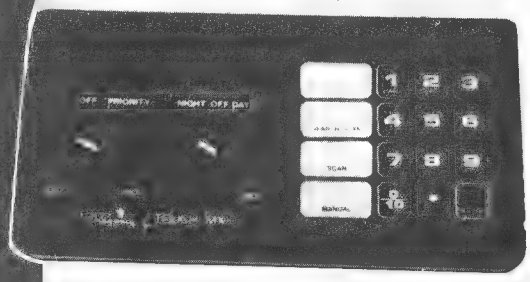
Victoria
Melbourne
Eastern Communications 288 3107
Moe Codin
Communications
27 4516
Hamilton Hamilton
Electronics 72 3333
Ballarat Wecam
39 2808

South Australia
Adelaide
Compucom 43 7981
ICS 47 3688
Mt Gambier Set
Services 25 2228

Western Australia
Perth Wills
Electronics 21 7609
Netronics 46 3232
Kalgoorlie Hocks
TV 21 1906

Tasmania
Launceston
Geston 44 3882
Advanced
Electronics 31 7075
Hobart Harvey
Skegg 47 6674
Burnie VK
Electronics 31 1708

VICOM



Model M100

The 10 channel, no-crystal scanner!

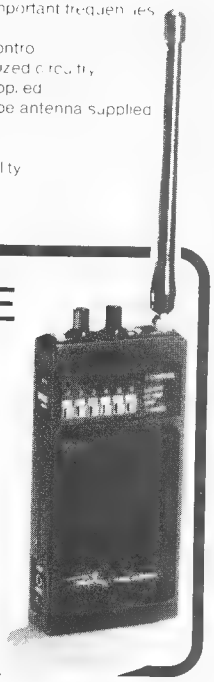
FEATURES:
- No crystals required
- 10 Channels
- 6 Bands
- All frequency search
- Priority
- 10 programmable RAM Channels
- Search Hold to stay with important frequencies
- Search and scan delay
- Manual Search or Scan Control
- Custom frequency synthesized circuitry
- AC supply and DC cord supplied
- Detachable, swivel telescope antenna supplied
- Attractive, durable case
- Top-mounted speaker
- Regency quality and reliability

$399

Model H604E

The hand-held scanner gives you the action wherever you go.

FEATURES:
- 6 Channels - so you'll hear all the action
- 4 Bands - LoVHF, HiVHF, UHF, UHF-T
- Advanced circuitry - combines small size with great performance
- L.E.D. channel indicators - bright and long lasting
- Channel lock outs - select only the channels you want to hear
- Step Control - advance channels one at a time
- Two Antennas - Flexible antenna and wire antenna included



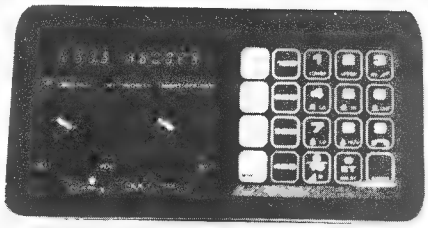
$169

price does not include crystals

Model M400

Hear all the action on 30 channels covering over 15,000 frequencies.

FEATURES
- No crystals required
- 30 Channels
- 6 Bands
- [illegible]
- Priority
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- Manual Search or Scan Control
- [illegible] Frequency Synthesized Circuitry
- AC Supply and DC Cord Supplied
- Detachable, swivel telescope antenna supplied
- [illegible] Battery not supplied
- Attractive, durable case
- Top-mounted speaker
- Rugged quality and reliability



$449

Quarrelsome Components

Greg Buckingham

"I'm the most powerful," said the battery.

"I'm the best," said the Ohm.

"Well, you're all no good without me," said the volt.

And so the argument continued on and on, without an end in sight, each one bickering and placing counter attacks upon the other's argument.

"Is there no end in sight to this continual senseless argument?" queried a lonely light bulb.

"I know I'm best" . . . "I won't give in" . . . "Cant' they see they are beaten?" The replies came quicker than electrons through a wire.

"Well," said a passive light globe, "the only fair way to settle who is boss would be in a Court of Light."

"I do believe you're right" . . . "That will end it once and for all" . . . "Now we will see who is right", came a volley of replies.

So at last it was settled — the community of Electrolysis was buzzing with excitement as the day of the trial drew near; the gentleman who is to take charge of proceedings is — Judge Capacitance.

"Order! order! . . . we will have no induced reactance in this court of light. If anyone fails to obey this rule, then they will be banished to the storage cell," retorted the Judge.

The Judge continued . . . "We are here today to hear the case between Messrs. Battery, Volt, Current and Ohm, and we, that is the jury of magnets and myself, will then decide upon our verdict."

"Protons and Nucleii, the defendants as mentioned previously, will represent themselves in this case, and all components will swear on the Bakelite," continued the Judge.

"Calling Mr. Ohm to the dial," bellowed Sgt. Sieman.

"Let us hear your case please, Mr. Ohm," said Judge Capacitance.

"Judge, magnets of the jury, Protons and Nucleii, it is an unequivocal fact that I am the most important part in any electric circuit. I, and I alone, have the ability to place a veritable strangehold on proceedings if I so desire," said Mr. Ohm.

"Rubbish! What a lie!" cried Mr. Volt.

"Mr. Volt, may I inform you that unless you remain silent, you will be transformed from this court," said the Judge in a stern manner.

"Thank you your Capacitorship," replied Mr. Ohm. "As I was saying before I was so rudely interrupted, if I wished I could swell up, increasing my resistance, effectively blocking the path used by the Battery, Volt and Current. Thank you, your honour, I rest my Omega," said Mr. Ohm.

"Mr. Current to the Dial," ordered the Sergeant.

"I would like to get straight into it, as I haven't got time to play about," said Mr. Current. "You know I've got a crop of Lumens that are intensifying all the time, and they are not getting any lighter to carry, let me tell you all about this. If I put my mind to it I could melt Mr. Ohm like mercury in a vapor. You know I'm the one that does all the real work in the circuit because, without me, who is going to go from one end of the flamin' circuit to the other? How do you think things are going to work if I decide to stop halfway? Well, that's finished me, can I go now?"

At this stage of the proceedings, the jury of magnets are in quite a flux about the case. It appears quite obvious to the people of Electrolysis that the jury's domains are misaligned and it will take a strong coercive force in order for them to think straight.

"Tap, tap, tap," the relay goes, demanding silence before the session will continue.

"Mr. Volt to the dial," demands Sergeant Sieman.

"Well Sir, I, Viscount Volt 5th, cannot help but feel intimidated by these snide remarks of the common components. So far as I'm concerned, these so-called valuable (and I use the term loosely) components can do what they like, but if I'm not there to push Mr. Current around, he is not going to go very far, so all this piffle about going around the circuit is utter nonsense and I don't want to hear any more about it. Now Mr. Ohm could swell up till he bursts, because until I decide to push Mr. Current through him, he is an absolutely useless feature of the circuit.

"In summing up, Mr. Learned Judge, it is quite plain, I'm sure, even to the jury of magnets who, by the way, appear to have very little permeability, that without great Viscount Volt 5th nothing will happen in the circuit. That is all I desire to say now. If I may, I shall adjourn back to the lovely Island of Voltmeter and my charming wife Voltaire."

"People of Electrolysis," said the Judge, "We have heard the evidence of three components here today and, as the time is drawing on, the court will close and resume at precisely 10 watt hours tomorrow. The jury will be required to spend the night at the hotel Magnetic Keeper, and may dine on magnetic nails or steel filings . . . court adjourned."

The town was divided in a three-way split, each believing it was supporting the right component, yet feeling no mutual attraction to any. Ten watt hours chimed out and the streets in the tiny town of Electrolysis were deserted, as all the judges and electrolytes were in the court room.

"Calling Mr. Battery," cannoned the Sergeant Sieman.

"I will not bore you with a long lecture," said Mr. Battery, "I am a component of facts. The fact is this . . . I am in the circuit to provide the volts to push the current through the ohms. Now, being a reasonable component, it has come to my attention that we are all vitally important to one another, if we are to have the circuit operational. Therefore, I put it to the jury to accept my idea of what equal status we all possess. Thank you," said Mr. Battery.

"Magnets of the jury, what is your verdict? Attraction or repulsion?" asked the Judge.

"Your Honour!" squeaked a voice from the crowd, "I am the most important part of the circuit."

"Who said that?" said the Judge.

"It's me, Sir," said the shy timid voice. "You see my Lord, that if I don't close, the battery can't supply the power, the volts can't push the current around the circuit, the current can't complete the path, and the ohm will not be able to resist because there will be nothing to oppose, so you see, your Honour . . . I am the most important!"

"Magnets of the jury, considering this new evidence that has been brought to my light, will you pass down your verdict?" said the Judge.

"Your Honor," sparked the head electromagnet of the jury, "we have found that as a North Pole is to a South Pole, so is a swtich to a circuit."

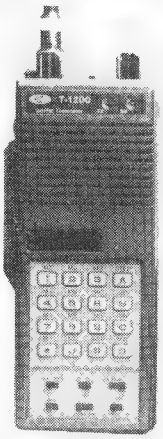
The electrolytes spilled out into the street with their new hero upon their shoulders . . . they adorned the switch with robes and a crown with the inscription "THE MOST IMPORTANT COMPONENT IN THE CIRCUIT" emblazoned across the front in bold atoms. ■

Join a NEW MEMBER NOW!

EMTRONICS

649 George St Sydney NSW 2000 Phone 211-0531

CORRESPONDENCE & MAIL ORDERS:
Box K21, Haymarket NSW, 2000, Australia
WRITE, PHONE OR CALL IN!



T1200 HAND HELD TRANSCEIVER

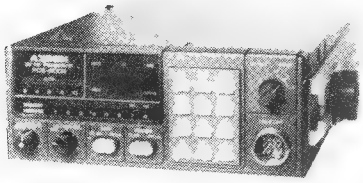
The Best On The Market!

2m/FM SYNTHESIZED PERSONAL TRANSCEIVER **$339**

In the race of popular demand for quality in fully synthesized, multifeature hand held transceivers, the T-1200 emerges as the commanding front runner. More than just handy, the T-1200 stands on a solid platform of big rig features which fully utilize the very latest microprocessor technologies. When you choose T 1200 you opt for 4 modes of automatic scan and search of 10 memories of automatic scan and search of 10 memories and the whole band When you choose T-1200 you opt for selectable output power of 3 5W or 1.OW with only a 6 ma drain for the optional continuous display of the bright LED readout. When you choose T-1200, you opt for a band range that covers more frequencies than any other hand held, and the ease of entering all frequencies from the integrated keyboard. Assuredly, when you choose T 1200 you opt for the majority leader which hands over features hand over fist

Write for Colour Brochure & Specs

NEW!



AZDEN

PCS-3000

MICROCOMPUTER 2M FM TRANSCEIVER

WRITE FOR FULL SPECS
OR SEE OUR CATALOGUE

- ★ 8MHz freq. cover. incl. CAP/MARS BUILT IN
- ★ Musical tone accomp. keyboard entries.
- ★ Pushbutton freq. control from mike or panel
- ★ 8 Channel memory with instant memory recall
- ★ Programmable band scan
- ★ 25 watt output ★ Mike has volume/squelch control

UNBELIEVABLE VALUE $379

JRC *Japan Radio Co., Ltd.*

NRD-515 & NSD-515

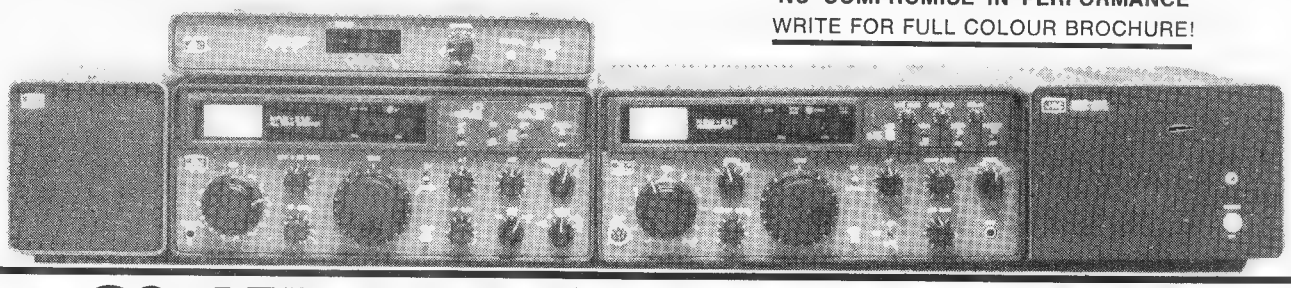
KENWOOD AND YAESU IN STOCK

A DREAM HAM RADIO STATION:

NRD515 a general coverage high performance receiver which only JRC know how to make, coupled with NSD515 a PLL synthesized transmitter into which JRC, a world leading manufacturer of professional radio equipment has concentrated its own know-how of advanced technology.

NO COMPROMISE IN PERFORMANCE

WRITE FOR FULL COLOUR BROCHURE!

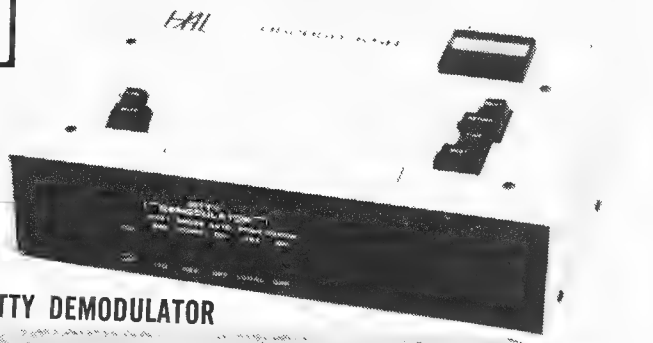


GO RTTY WITH **HAL** *THE LEADER!!*

WRITE FOR FULL HAL CATALOG

LOW COST KEYBOARD SEND-RECEIVE TERMINAL

AUTOMATIC SEND-RECEIVE TERMINAL



RTTY DEMODULATOR

FORWARD BIAS

ANNUAL SUBSCRIPTION INCREASE

The annual subscription for 1982 for VK1 is to be increased to $27.50, an increase of $2.50 over the fee for 1981.

In his budget for 1982 our Treasurer, Kevin VK1OK, has allowed for the following items of expenditure:—

Repeater costs $200, Forward Bias Notes $288, NAOCP/AOCP classes $300, QSL Bureau $350, meeting room hire $150, licences $102, administrative costs $115.

With an anticipated membership of approximately 200 the VK1 component of your subscription will be a little over $7. To this must be added the Federal component of $20, bringing the total subscription to $27.50 for all full and associate members. Note that the fee for other members of the same family (with no copy of AR) will be $18.20 and for bona fide students $17.25.

Pensioners in possession of a Department of Social Security Pensioner Medical Benefits Card should apply to the Divisional Committee if they seek a concession on their subscription fee.

You may ask what you get for your $27.50. The following is a list of the benefits I see in being a member of the WIA.

From Federal: Amateur Radio magazine, free Hamads, an intermediary between you and the DOC, a voice in the international allocation of frequencies, the RD, Ross Hull and other national contests, the Intruder Watch Service, the EMC Service.

From VK1: The QSL Bureau, three excellent local repeaters, NAOCP and AOCP classes, book sales service, monthly meetings for your information and enjoyment and (in wee small print) this column.

WICEN ACTIVITIES

The VK1 WICEN Group will provide communications facilities for the ACT Pistol Association Championships to be held over the long weekend in January. These championships are to be held at the three pistol ranges located at Mount Majura (2) and Mount Ainslie.

WICEN operators will work with the Range Officers at each of these venues to provide a communication service covering the transmission of results to the central control at Mount Majura and in arranging for the movement of competitors between the various venues.

A total of 18 volunteers will be required to cover this exercise. Volunteers should contact Rob VK1ZAI for further details. Meals and refreshments (?) will be provided by the ACT Pistol Association.

1982 CALL BOOKS

A further supply of the 1982 Call Book has been received by the Book Sales Manager, Ken VK1NDK, and will be available at future General Meetings. While on this subject, congratulations to all at Federal who were concerned with the compilation and printing of this Call Book. It's well worth the price.

REPEATER NOTES

Peter VK1DS, our King of the Mountain, and a group of his merry men visited Mount Ginini recently to check up on the repeater installation after a long and particularly severe winter in the high country.

Despite the fact that Mount Ginini (5800 feet ASL) has been covered by up to 8 feet of snow for the last few months and completely inaccessible since about last May, our Channel 7 VHF repeater has operated during that time without fault.

It is hoped that the new UHF repeater, which has been on test for several months in town, will be installed on Mount Ginini before Christmas.

FOX HUNTS

After several years in the doldrums "fox hunting" has been revived in VK1. Several hunts have been conducted recently and others are planned. Good to see our near neighbours in VK2 — the Queanbeyan mob — joining in and, I understand, organising some of these events. Fortunately we have very few "wild turkeys" in VK1 and it would appear that any who are game enough to try would very quickly come under notice of the battery of "sniffers" currently being constructed. And let's not forget the Doppler Scan.

To each of you and yours from me and mine, a joyful Christmas and a happy and prosperous New Year.

7 VK1KV. ■

VK2 MINIBULLETIN

NOTICE

The Annual General Meeting of the Wireless Institute of Australia, New South Wales Division, will be held at 10 a.m. on Saturday, 27th March, 1982 at 14 Atchison Street, Crows Nest, N.S.W. Agenda items for this meeting may be submitted to the Divisional Secretary, P.O. Box 123, St. Leonards, N.S.W., 2065, up to 10 a.m. on Thursday, 25th February, 1982. Nominations for election to Council close on the same day, Thursday, 25th February, 1982. Nomination forms may be obtained by ringing or writing to the Diivsional office.

(Sgd.) Susan Brown VK2BSB
Hon. Sec., WIA, N.S.W. Div.

Any ordinary (i.e. full) member of the NSW Division may stand for election to Divisional Council. Would members please note that no business may be discussed and voted on at the AGM unless all members receive notice of such business (see Article 31). Please make sure that any motions you wish discussed reach Divisional office before Thursday, 25th February.

COUNCIL REPORT

At the October meeting, Divisional Council adopted guidelines for Affiliated Club Broadcasts. These are:—

1. Only those club stations relaying Divisional broadcasts be permitted a five minutes news segment.
2. Affiliated club broadcasts to be limited to five minutes maximum duration immediately following Divisional broadcasts.
3. Transmission to be on repeaters used for WIA broadcast relay or by station conducting an HF relay.
4. The content to be news and information of a local nature only.
5. Identification to be the affiliated club call sign, the name of the affiliated club, and should include the name and call sign of the operator and a statement that what follows is new from the particular club concerned, and not from the WIA.
6. Broadcasts to adhere strictly to the guidelines laid down for WIA broadcasts.
7. All affiliated clubs conducting such broadcasts to advise the NSW Division WIA of times and frequencies used.
8. Call-backs may be taken at the discretion of the affiliated club concerned.

At present the following affiliated clubs are authorised to relay Divisional broadcasts — Westlakes ARC on 1812.5 kHz, Orange ARC on channel 6700, Central Coast ARC on channel 6750, Summerland ARC on channel 6800 and Illawarra ARS on channel 6850.

Council has regretfully decided to discontinue personal AOCP lecture classes as from the end of 1981 because of insufficient students and a consequent heavy financial loss.

Certifficates of Affiliation, designed and prepared by Steve VK2VHP, were received with approval at the October meeting. All clubs at present affiliated with the NSW Division (32 in all) have been issued with a certificate.

This year, for the first time, Divisional Council was pleased to award the "Dick Smith NSW Educator of the Year Award" to Kim Stevens VK2ASY. Kim was nominated by Orange ARS for his sterling efforts in educating prospective amateurs in the Orange area during the year. Congratulations, Kim! There were several nominations which were received too late to be included in Council's decision, so we hope the nominators will re-submit them for next year's award.

Many thanks to Trent Sampson VK2YHA/NDK, who has volunteered and been accepted as VK2 Contest Publicity Officer for 1981/82.

Also at the October Council meeting Steve VK2VHP presented a comprehensive report on his investigations into the relocation of the Divisional office to the Parramatta area. Council has decided to present a detailed submission to members at the 1982 AGM in March.

PREVIEW OF THE GOSFORD FIELD DAY, 1982

Mark your calendars now for the largest Field Day in the southern hemisphere! (Any challenges for this claim can be addressed to Box 123, St. Leonards, HI.) It's on again on Sunday, 21st February, 1982, at Gosford Showground, Showground Road, Gosford. Events include an open scramble, pedestrian direction finding fox

hunts on 144.3 AM and 146.55 FM, ladies' and gent's quizzes, children's events, outings to the Reptile Park or bus trip, etc. The excellent disposals stall will also be on again. Items for disposal must be booked in advance — contact Bill Smith VK2TS at RMB 4525, Gosford 2250 or (043) 74 1207 AH for forms and lot numbers. See you there!

ORANA ARC

For a new club, they certainly know how to get the ball rolling. Along with negotiations for a proposad new VHF repeater in the Warrumbungles, the club has been busy educating some 20-odd candidates for the latest Novice exam, which it is hoped could be held in Dubbo. In addition, they have found time to put on amateur radio displays at Wellington and organise successful family barbecues.

ORANGE ARC

Another very active club in the west with many activities, including WICEN participation in the recent two-day bike trials and an interesting monthly magazine "Mini Tuned-In" edited by Ross VK2BRC. From the magazine, a report by Wally VK2DEW on the bike trials: ". . . The briefing on the Saturday started on time and everyone received their map, access notes, log sheets, etc. Frank VK2ZFE and Jack VK2DDN set up the portable two metre repeater and Jack stayed with it as caretaker/relief operator in case of failure. Thanks, Jack, for staying for the night and for assisting in the search (for a lost rider). While this was going on, Robert VK2ZRJ and Eddie VK2YJO were fitting their rigs in the two Datsun 4 x 4 vehicles of the clerks of the course. As well, a data link was established to trial headquarers on 432 MHz, thanks to VK2BVU and VK2BHM, who lent their FM321s. Apart from noise on 80 metres and a crackle on 2 metres, both days went off first rate!"

Details of four clubs affiliated with the NSW Division.

WAGGA AMATEUR RADIO CLUB

PO Box 71, Kooringal 2650.

Call signs: VK2WG, VK2NWG, VK2RWG.

Nets: Saturdays at 1200 hrs. on 28.49 MHz.

Meetings: Last Friday at Wagga Rescue Club, Bolton Street, Wagga.

Classes: NAOCP May to November, Wednesdays 1930, at Rescue Club; AOCP each second year.

President: Jeff VK2KBK; Vice-President: Allan VK2KAW; Secretary. Russ VK2AZR. Other Committee: Bob VK2DJQ, Neil VK2YWR/VTD, Peter VK2DUS.

Magazine: 10 issues per year of "QRM", edited by Rex VK2YA.

Repeater: VK2RWG on 6750, ERP 50W, time out 3m, sited at Flakeney, 20 km SE of Wagga.

Field Day: Whisper has it, or was it just an ugly rumour, that Wagga will be hosting next year's SWARS Convention over the long weekend in October.

ST. GEORGE AMATEUR RADIO SOCIETY

PO Box 77, Penshurst 2222.

Nets: Tuesday at 1930 on 14.11 MHz, Tuesdays at 2000 on 28.52 MHz, Thursdays at 2000 on channel 6800, Sundays at 0800 on 3.555 MHz, all using VK2LE.

Meetings: First Wednesday at 1st Allawah Scout Hall, South Hurstville.

President: Derek VK2AZS; Vice-President: Jim VK2NPA; Secretary: Gordon VK2BGA. Other Committee: Brian VK2ZBP, Allan VK2XF, Paul VK2ZSA, Ellis VK2DDW.

Magazine: Dragnet (quarterly), edited by Jim VK2NPA, also Dragnette at each meeting.

Repeaters: VK2RLE on 6800, ERP 250W, time out 4 min., located at Heathcote. VK2RDX on 6650, ERP 45W, time out 4 min., located at Mount Bindo, near Oberon.

SGARS also has a very active WICEN group, a computer group and an annual picnic and dinner.

ORANGE AMATEUR RADIO CLUB

PO Box 1065, Orange 2800.

Nets: Sunday at 2030 on 6700 using VK2AOA ("Fred" net). Sundays at 0800 on 3.61 MHz using VK2BVW (Western Districts Net).

Meetings: First Fridays at 1930 in Canobolas High School, Orange.

Classes: NAOCP.

President: Peter VK2TK; Vice-President: Kim VK2ASY; Secretary: Ross VK2BRC. Other Committee: Rob VK2ZRJ, Eric VK2VOH, Bruce VK2DEQ, Frank VK2ZFE.

Magazine: "Tuned In", quarterly, edited by the committee. "Mini Tuned In", approximately monthly, edited by Ross VK2BRC.

Repeater: VK2RAO on 6700, ERP 100W, time out 3 min., located at Mount Canobolas.

Field Day: Usually November at Molong.

LIVERPOOL AND DISTRICT AMATEUR RADIO CLUB

PO Box 690, Liverpool 2170.

Nets: Sundays at 0930 on 3.58 MHz, Mondays at 2030 on 6550, both using VK2AZD.

Meetings: Second Tuesdays at Liverpool Public School, Bigge Street, Liverpool, 0930 hrs.

Classes: AOCP and NAOCP at above school, Tuesdays 1900.

President: John VK2KDJ; Vice-President: Arthur VK2DUW; Secretary: Kevin VK2PZ. Other Committee: John VK2VUK, Adrian VK2KCI, Dave VK2DPJ.

Field Day: March in Liverpool area.

COMING EVENTS

1st February (Sunday): Gosford Field Day.

25th February (Thursday), 10 a.m.: Close of agenda for AGM and of nominations for Council.

27th March (Saturday), 10 a.m.: Annual General Meeting, NSW Division.

Merry Christmas and Happy New Year to all!

Susan Brown VK2BSB. ■

VK6 NOTICE

VK6 DIVISIONAL CHRISTMAS MEETING

on 15th December is to be held in the Ballroom of Herdsman Motor Hotel, Wembley, at 1930h.

VK4 WIA NOTES

CHRISTMAS GREETINGS

Firstly this month, season's greetings to all readers from the VK4 Division.

COUNCIL ELECTIONS

Queensland members will shortly have the opportunity to elect the 1982 VK4 Council. There are 12 members on the Council and they are responsible for the management of the affairs of your Division. They can, however, only be as effective as members allow them to be. So keep in touch with your Councillors, feed them ideas and support them as necessary

NATIONAL FIELD DAY

It's time to be making arrangements for your involvement in the John Moyle Memorial Field Day 1982. Queensland amateurs and clubs have been prominent in this event for a number of years now and 1982 will be no exception. This is always a good opportunity to try out your portable WICEN equipment and find out if it is as reliable as you think it is

EDUCATION

Council has examined the educational problems made evident by the release of the recent exam pass rates. As a result, the educational kits offered through the Book Shop are being upgraded by the addition of study guides, sample exams, a call book and a copy of the Regulations Handbook to the theory book, syllabus, cram book and Morse tapes already offered. A sub-committee has been formed to carry out this upgrade. Other sub-committees have been formed to look at the production of instructor training programmes, a "History of Amateur Radio in Queensland" and a series of "Amateur Radio Techniques" seminars. All these activities are aimed at the creation of well-rounded amateurs socially and technically, with an emphasis on education past the licence level

These committees are going to need significant assistance from members if the aims are going to be achieved so be ready to step forward when the time comes

INTERFERENCE

The local DOC has requested that mobile amateur stations keep clear of radio communications sites whilst transmitting. This reminder has come about due to some interference recently in the Maritime Mobile Service in SEQ. Keep this in mind and pass the word around.

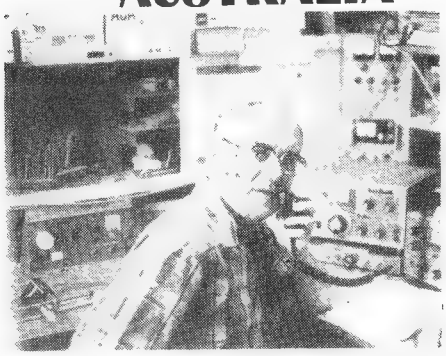
RTTY REPEATER

The SEQTG has been testing their microprocessor controlled RTTY repeater. The repeater can be transparent or can perform a number of functions using Baudot and ASCII codes. It promises to be a very versatile installation and has coverage over most of SEQ.

UHF REPEATERS

The Brisbane VHF Group's UHF repeater is now installed on the Channel 0 tower on Mt. Cootha and is giving wider coverage than first expected. The Sunshine Coast Club now has an operational repeater on Mt. Buderim with equally good coverage. ■

AMSAT AUSTRALIA



R. C. Arnold VK3ZBB

PREDICTIONS

DECEMBER 1981

	OSCAR 8				OSCAR 9		
	Day	Orbit No.	Eqx GMT	Eqx °W	Orbit No.	Eqx GMT	Eqx °W
1	335	19063	0115	84.2	839	0100	149
8	342	19160	0044	66.6	945	0126	156
15	349	19258	0036	74 8	1051	0016	138
22	356	19356	0107	82.8	1157	0040	144
29	333	19454	0139	91 1	1263	0103	150

Note: The UO9 predictions are derived from observations during the first 200 orbits and may not be reliable as the satellite has yet to stabilise (as at 28/10/81).

UOSAT OSCAR 9

By the time these notes are published amateurs will be aware of the faultless launch of UOSAT, the British educational satellite, at 11.27 on 7th October, 1981.

The orbit parameters are very close to those predicted and are:—

Orbit period 95.45 minutes, increment 23.89 degrees, height 530 km, inclination 97.47 degrees.

Many amateurs listened to a description of the launch direct from Vandenburg Air Base and keenly awaited telemetry information from the satellite. This was first heard by Colin VK5HI on orbit No. 2 as high speed telemetry (probably 300 band ASCII) on the General Beacon on 145.825 MHz. Subsequently, Peter VK7PF deciphered this telemetry and the information was conveyed to AMSAT via Charlie VK3ACR.

At the time of writing, only the General Beacon is operating and we eagerly await operation of the other beacons and experiments — probably late November.

Information on new frequencies in use and any other data on the operation of the satellite would be welcomed by Charlie VK3ACR (phone (03) 762 2903).

Meanwhile, congratulations are in order to the workers behind UOSAT. To the University of Surrey team, to AMSAT-UK, AMSAT-DL and AMSAT itself which organised the launch.

UOSAT OSCAR 9 is sun synchronous and two or three orbits are within sight of Australia each afternoon between 2 p.m. and 5 p.m. local time. This is not too convenient for the working amateur but ideal for educational programmes in schools. As has already been demonstrated by VK7PF and others, data can be recorded automatically and decoded at leisure.

Travelling north-south, the satellite will also appear in the early hours of the morning, i.e. 12 hours from the afternoon times, but generally speaking, amateurs will confine their activities to the south-north afternoon passes. Determination of the time to listen is quite easy:—

1. Take the time of the first equator crossing for the GMT day as published or advised on WIA broadcasts.
2. Add to this time several increments of 95.45 minutes to give the times of the subsequent four or five orbits' equator crossings.
3. If you are in a southerly location, e.g. Melbourne, add 79 minutes to the above times. If you are further north, add a little more, e.g. 83 mins. for Mackay. This will give the approximate times you will first hear the satellite. The time of a pass will last up to 12 mins. 20 secs. The most likely orbits to be heard are the second, third and fourth of each day.

The signal on the General Beacon on 145.825 MHz is NBFM and is very strong, the normal FM receiver with ground plane antenna will provide adequate reception.

Without hesitation, AMSAT-UK has given the Wireless Institute permission to reprint its "UOSAT Technical Handbook" and this will be done over the coming months with the incorporation of amendments and updates. Thanks again to AMSAT-UK and its Secretary, Ron Broadbent. As I said last month, AMSAT-UK is a worthwhile organisation to join; it publishes some good material in its periodical. By the way, if you want something from AMSAT-UK or any other similar organisation, don't forget to give them something towards the cost and postage; like the WIA, they exist on a shoestring.

Here is the first segment of the UOSAT Technical Handbook which deals with Telemetry and Data Beacons.

TELEMETRY (Dr. Lui Mansi, UOS/AMSAT-UK)

The telemetry system has been deliberately designed to cater for a wide range of user ground station facilities and to provide a high degree of flexibility. 60 analogue channels and 45 digital status points are monitored around the spacecraft, encoded and are available for transmission via the VHF, UHF and SHF beacons in the following formats:—

1200 baud ASCII, 45.5 baud RTTY.

600 baud ASCII*, 300 baud ASCII*, 110 baud ASCII, 10 or 20 w.p.m. Morse code (Channels 00-09 only).

75 baud ASCII*, synthesised voice (in conjunction with the primary s/c computer).

The telemetry format is: 1 start, 7 data, even parity bit, 3 stop bits.

The format marked * are options on the 1200 baud output and are not available smiultaneously. Any selection of the primary formats are available to the UHF and VHF data beacons simultaneously, with the data format on the 2.46 GHz SHF beacon being that currently selected for the VHF data beacon.

The 1200 baud family also have the facility to dwell on any selected analogue channel.

The analogue telemetry channels have an encoding resolution of 0.1 per cent and an accuracy of 2 per cent, however the high current measuring channels suppress the least significant digit.

It is anticipated that the two VHF and UHF data beacons will carry different data formats to cater for the widest possible audience.

DATA BEACONS (Bob Haining, UOS/AMSAT-UK)

Two VHF and UHF beacons provide the primary engineering and experiment data links to the outside world and have been designed to provide a healthy satellite-to-ground transmission link to enable reliable and straightforward reception by the simplest of ground stations. A standard, unmodified NBFM VHF or UHF amateur receiver and a small, fixed, cross-dipole antenna should suffice to gather data from most orbit passes. The addition of a+10 dB gain yagi steerable in azimuth only would provide coverage of the low elevation passes. The data sources available to these beacons are:—

Telemetry, ASCII, Baudot, Morse Code.

Primary s/c Computer: Serial o/p. port No. 1, serial o/p. No. 2, speech synthesiser.

Video Display Expt.: Camera image data, text/news/schedules/graphs.

General Data Beacon: Frequency, 145.825 MHz; power output, 350 mW; modulation, NBFM ± 5 kHz devn.; total DC/RF efficiency, 45 per cent; unwanted signal levels, > —65 dB ref. carrier; max. doppler, ± 3.1 kHz.

Engineering Data Beacon: Frequency, 435.025 MHz; power output, 650 mW; modulation, NBFM ± 5 kHz devn.; total DC/RF efficiency, 40 per cent; unwanted signal levels, > —65 dB ref. carrier; max. doppler, ± 9.3 kHz.

DATA TRANSMISSION FORMATS

High speed data at 1200 BPS from the telemetry, computer and video display expt. are transmitted as phase-synchronous AFSK using 1200 Hz ("0") and 2400 Hz ("1)" synthesiser notes. The "1"-"0" data transmissions occur at the zero crossings of the tone waveforms thus reducing the DC component of the data modulation spectrum and resulting in exactly one cycle of 1200 Hz representing a data "0" and exactly two cycles of 2400 Hz representing a data "1". This method lends itself to quite simple but effective decoding techniques.

Data at speeds other than 1200 BPS are transmitted asynchronously using 1200 Hz ("1") and 2400 Hz ("0") tones, except Morse code in which a 1200 Hz one only is employed.

(The next section of the book will be published next month.) ■

ALL KENWOOD SOLD OUT UNTIL 1st FEB., 1982!

YES! **THE SNOWY RIVER COMPANY PTY. LTD.** is unable to supply any of our Kenwood amateur transceivers until 1/2/82 due to a total sell-out!!
All our Kenwood sold after 1/2/82 will carry our new **2 YEAR WARRANTY**

ALL YAESU EQUIPMENT from **"THE SNOWY RIVER COMPANY PTY. LTD."** is in **very** short supply — "Amateurs should check that the model they require is in stock before mail ordering". Failure to do so may result in disappointment. Full 12 months warranty on **YAESU.**

THE SNOWY RIVER COMPANY PTY. LTD., PO Box 227, Greenacre 2190 NSW. Ph. (02) 709 1557

"HAMTENNA" T.M.

EXCLUSIVE AUSTRALIAN DISTRIBUTOR
COLEMAN INDUSTRIES PTY. LTD.
100% AUSTRALIAN "SINCE 1960" Inc.

THE SNOWY RIVER COMPANY PTY. LTD
P.O. Box 227, Greenacre 2190, N.S.W.
Ph. (02) 709 1557 9-5 5 days, 9-12 Saturday
Authorized dealer for "HAMTENNA"

50 MHz WHIPS	**A.D.P. Price**
M6-1 — 6m Fibreglass ¼ Wave	**$15.00**
M6-2 — 6m Helical ¾ Wave	**$20.00**
	Plus $5.00 Rail

144 MHz WHIPS	
M2-1 — 2m Fibreglass ¼ Wave	**$8.00**
M2-2 — 2m Fibreglass 5/8 Wave	**$18.00**
M2-3 — 2m Helical ¾ Wave	**$20.00**
	Plus $5.00 Rail

400-500 MHz WHIPS	
M400-1 — 400 MHz S/Steel ¼ Wave	**$6.00**
M450-1 — 450 MHz S/Steel ¼ Wave	**$5.50**
M500-1 — 500 MHz S/Steel ¼ Wave	**$5.00**
	Plus $5.00 Rail

SPECIAL OFFER: $199.00 for complete H/F set
"90 days only"

HF AMATEUR WHIPS	
M10-1 — 10m Hamtenna 60"	**$36.00**
M15-1 — 15m Hamtenna 60"	**$36.00**
M20-1 — 20m Hamtenna 60"	**$37.00**
M40-1 — 40m Hamtenna 60"	**$38.00**
M80-1 — 80m Hamtenna 60"	**$39.00**
M160-1 — 160m Hamtenna 60"	**$40.00**
	Plus $5.00 Rail

"HAMTENNA" is a registered trade mark.

Also available — Long Range Receiving Antennae

M100 — 1 MHz Whip + Lead Assy. 60"	**$20.00**
M101 — 1/80 MHz Whip + Lead Assy. 60"	**$20.00**
M102 — 80 MHz Whip + Lead Assy. 40"	**$18.00**

PLUS — Base accessories, adaptor fittings, bases, base, lead and connector and extension leads.

AND — SPECIAL WHIPS MADE TO ORDER.
YES! You give us the frequency and we will provide the Whip to ITU Spec.!!

"HAMTENNA" DEALERS WANTED!

Authorised Dealerships available in all States.
Enquiries invited NOW!!

Contact — **COLEMAN INDUSTRIES PTY. LTD.**
"Incorporated" since 1960.

P.O. Box 227, Greenacre 2190, Sydney, N.S.W.
Ph. (02) 709 1557 — Mon.-Fri., 7 a.m.-9 a.m. and 5 p.m.- 7p.m.
"National Distributor"

"HAMTENNA"

AT LONG LAST — The amateur mobile antenna that's guaranteed to work and to work better than what you're probably using now! Backed by a **5 years unconditional no-worries warranty — yes 5 years.** Exclusive "world release" and soon to be available in the U.S.A. and then throughout the world, the "Hamtenna" is produced in Australia on one of the most sophisticated and automated production antenna lines in the world, and each antenna is pre-tested to ITU Plenipotentiary Conference Standards (W.A.R.C. Geneva, 1979).

"GOLD HAMTENNA"

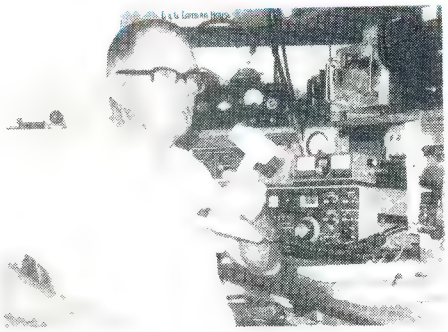
Also available **Gold Plated** to "Hamtennas" gold standard ("with certified certificate of value"). Example — When ordering "Gold Hamtenna" IXGM20-1 add $10.00 extra for "gold".

KIT VERSIONS
LESS $10.00 off A.D.P. (Solder and epoxy not supplied)

NOTE:
All "Hamtennas" are designed for use with a resonant length of coaxial cable, i.e. ⩽ multiples of ½ wave lengths at frequency of operation.
(⩽ means less than or equal to.)

Formula: Wave length ÷ 2 × 39.37 ÷ 12 × .666 = coax length in feet and inches.
All "Hamtenna" leads are made to this formula.

VHF-UHF
AN EXPANDING WORLD



Eric Jamieson, VK5LP
Forreston, S.A. 5233

VHF/UHF BEACONS

Freq.	Call Sign	Location
For 28 MHz beacons refer October 1981.		
50.005	H44HIR	Honiara
50.008	JA2IGY	Mie
50.020	GB3SIX	Anglesey
50.023	HH2PR	Haiti
50.025	6Y5RC	Jamaica
50.035	ZB2VHF	Gibraltar
50.036	HC1JX	Quito
50.038	FY7THF	French Guiana
50.040	WA6MHZ	San Diego
50.048	VE6ARC	Alberta
50.050	ZS3E	South Africa
50.060	PY2AA	Sao Paulo
50.070	VP9WB	Bermuda
50.070	YVZZ	Caracas
50.080	TI2NA	Costa Rica
50.088	VE1SIX	New Brunswick
50.100	KH6EQI	Pearl Harbour
50.498	5B4CY	Cyprus
51.022	ZL1UHF	Auckland
52.013	P29SIX	New Guinea
52.150	VK5KK	Arthurton
52.200	VK8VF	Darwin
52.250	ZL2VHM	Palmerston North
52.300	VK6RTV	Perth
52.320	VK6RTT	Carnarvon
52.330	VK3RGG	Geelong
52.350	VK6RTU	Kalgoorlie
52.370	VK7RST	Hobart
52.400	VK7RNT	Launceston
52.420	VK2WI	Sydney
52.425	VK2RAB	Gunnedah
52.435	VK3RMV	Hamilton
52.440	VK4RTL	Townsville
52.510	ZL2MHF	Mt. Climie
52.800	VK6RTW	Albany
144.400	VK4RTT	Mt. Mowbullan
144.420	VK2WI	Sydney
144.475	VK1RTA	Canberra
144.500	VK6RTW	Albany
144.550	VK5RSE	Mt. Gambier
144.600	VK6RTT	Carnarvon
144.700	VK3RTG	Vermont
144.800	VK5VF	Mt. Lofty *
144.900	VK7RTX	Ulverstone
145.000	VK6RTV	Perth
147.400	VK2RCW	Sydney
432.440	VK4RBB	Brisbane
432.450	VK3RMB	Mt. Bunningyong

The only point of note this month regarding beacons is the firing up of the VK5VF 2 metre beacon again. **Mark VK5AVQ** got the old beacon going again pending the outcome of something to replace it. The 6 metre beacon remains silent and operators will have to rely on the VK5KK beacon which unfortunately doesn't run 24 hours a day for various reasons — one of which is that **David VK5KK** likes to be on 6 metres himself at times, and when he is then the beacon is silent. However, with the advent of increased Es activity for the next two months there should be enough general 6 metre activity from VK5 to make other places aware of band openings.

VK2RCW BEACON

This being a rather unique beacon, the following details have arrived from **Mark VK2DI** . . . "This beacon was conceived and built by **Barry VK2AAB** and operates under the sponsorship of the Hornsby and Districts Amateur Radio Club. It runs an FM transmitter which is modulated with a microprocessor keyed audio oscillator. The idea of the beacon is that it can provide 24 hour CW practice for anybody who has a 2 metre FM receiver capable of being tuned to 147.400 MHz.

"The present location of the beacon is Normanhurst, just north of Sydney. The transmitter runs about 5 watts to a ground plane antenna which seems to cover the major part of the Sydney metropolitan area.

"The micro used is a 2650, and the software provides for a range of speeds from around 5 .w.p.m. to about 15 w.p.m. It takes about an hour to cycle through this range.

"The frequency 147.400 MHz was allocated by the NSW Division for the beacon, which being an FM device was not really suited to placement in the conventional beacon segment of the band.

"The beacon has been accepted by the great majority of Sydney 2 metre operators, and has without doubt played a significant part in the education of those aspiring toward the AOCP and NAOCP."

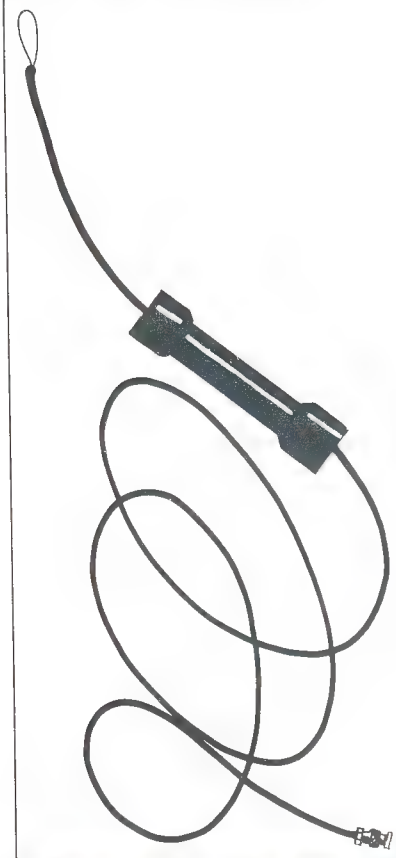
Thank you for that information, Mark, you have probably answered a few former questions of why the beacon operated so high in the band and why it transmitted CW.

BEACON INFORMATION NEEDED

Over the months I have been asking for information of the operating habits of the various beacons around Australia. After about 12 months of asking I have received information from the custodians of the following beacons: **VK2RCW, VK7RNT, VK7RST, VK7RTX, VK4RTT, VK4RBB, VK2WI, VK5WI, VK3RMV.** Information is required from the following: **VK5KK, VK5VF, VK8VF, VK6RTV, VK6RTT, VK6RTU, VK3RGG, VK3RTG, VK2RAB, VK4RTL, VK6RTW, VK1RTA, VK5RSE and VK3RMB.** So that makes nine replies and 14 still to reply. **PLEASE:** Will custodians or someone responsible send information as soon as possible detailing call sign, frequency, power, antenna, mode and speed, location and height above sea level if possible. I am frequently being asked for such information by letter and on the air, and it

*NEW!

2 METRE "STOCKWHIP"



Communicate with SCALAR

A fold away, flexible dipole antenna. Enables you to extend the range of your 2 meter hand held transceiver . . . At home, in the office, camping, caravanning, – all sorts of places!

You replace the transceiver stubby with the Scalar "Stockwhip" – hang it up by the convenient nylon loop – and listen to the improvement.

SCALAR GROUP
20 Shelley Ave
Kilsyth 3137
VIC. 725 9677
N.S.W. 502 2888
QLD 44 8024
W.A. 446 9177

would be useful for such information to be available through the pages of the Call Book. Until everyone replies I cannot proceed. Would you please oblige?

NATIONAL VHF FIELD DAY

It seems Murpy's Law has been at work again. Last month I gave details of the National VHF Field Day to be held on 12th and 13th December to coincide with the first weekend of the Ross Hull Contest. Well that weekend is the second weekend of the Ross Hull Contest (see October 1981 AR for announced details of the 1981 Ross Hull Contest starting on 5th and 6th December). The Geelong Amateur Radio Club advised me the dates would be 12th and 13th December, so that's what they are — it will cause less confusion to leave them as announced last month than to try and alter them. The October 1981 issue of the Geelong Newsletter confirms the 12th and 13th, so there you are! Your scores should be postmarked not later than 13th January, 1982.

On the matter of Field Days I note the New Zealanders will be holding their annual December VHF Field Day on 5th and 6th December. It is to be hoped propagation will be better than it has been for some years now for an exchange of information between the two countries — most times no contacts have eventuated.

OVERSEAS CONTESTS

The 1981 Fall SMIRK Party Contest was scheduled for 7th and 8th November, 1981, but arrived too late for inclusion in the November issue, and as scores must be postmarked not later than 22/11/81 it made an impossible situation, especially as the scores must be on the new forms and no supplies have been sent, but requires entrants to obtain them from WB5SND. For such contests to be taken up at all in countries such as Australia or New Zealand information needs to be forwarded to the various magazines many months before to allow for printing deadlines, and no one should expect individual entrants to have to send to an overseas address for an entry form! Such forms should be available from at least one address in the country being asked to participate.

With thanks to **Bob VK5ZRO** for sending details of a JA-VK 6 metre contest. The first period was to be held from 20/11 to 29/11/80 and to be open to 6 metre operators in Japan and Australia, with the object of cultivating mutual friendship and raising activities on the 6 metre band. Frequency 52.000 to 52.500 MHz modes CW, SSB and AM.

Whilst the above information doesn't help the November contest, a similar contest is to be held from 0000Z on 12/3/82 to 2400Z on 21/3/82, and I propose giving you full details of the contest in the February 1982 issue; seems little point in duplicating all the information at the moment.

Again it is a pity the news was not sent direct much earlier, it was only due to the vigilance of **Bob VK5ZRO** that we know anything of it now.

To sum up: Contests of any kind, from wherever, should be in my hands three months before the date of the contest to allow for publication at least one month ahead of the period of the contest. The distribution dates of "Amateur Radio" do vary from time to time, and a contest appearing during the first week of a particular month may well be over before you receive that month's copy of AR. Hence the need for at least a month's notice to prospective operators. WILL ALL CONTEST ORGANISERS PLEASE NOTE!

BAND CONDITIONS FAIR

Overall, the past month or so hasn't been the most exciting. There have been numerous openings extending from a few minutes to several hours between Australia and Japan, some dates being 3/10, 4/10, 8/10, 11/10, 12/10, 13/10, 15/10, 16/10, 17/10, 18/10 (this being the earlier deadline required for the December issue!).

Bob VK5ZRO has been on holidays and been having quite a ball working JAs. 13/10 open to JA1, 2, 3 and 4. On 16/10 opened three times to JA, first at 0001Z and the last at /311Z. Signals 5 x 9 from JA7, 8 and 9 ,mainly on 50 MHz, with a few signals eventually appearing on 52 MHz and being worked. Bob also reported hearing FO8DR on CW on 15/10.

The above, plus an occasional Es contact interstate, the VK5 scene has been very quiet, both on 6 and 2 metres.

Readers should be interested to know that **Graham VK5GW** will be operational on 6 and 2 metres during 1982 from Oodnadatta in the far north of South Australia. He should be running reasonable power to good antennae and the distance of 600 miles or about 1000 km satisfactory for Es contacts. **Geoff VK8GF** in Alice Springs should be able to work Graham on 2 metres without a lot of difficulty.

OTHER AREAS OF INTEREST

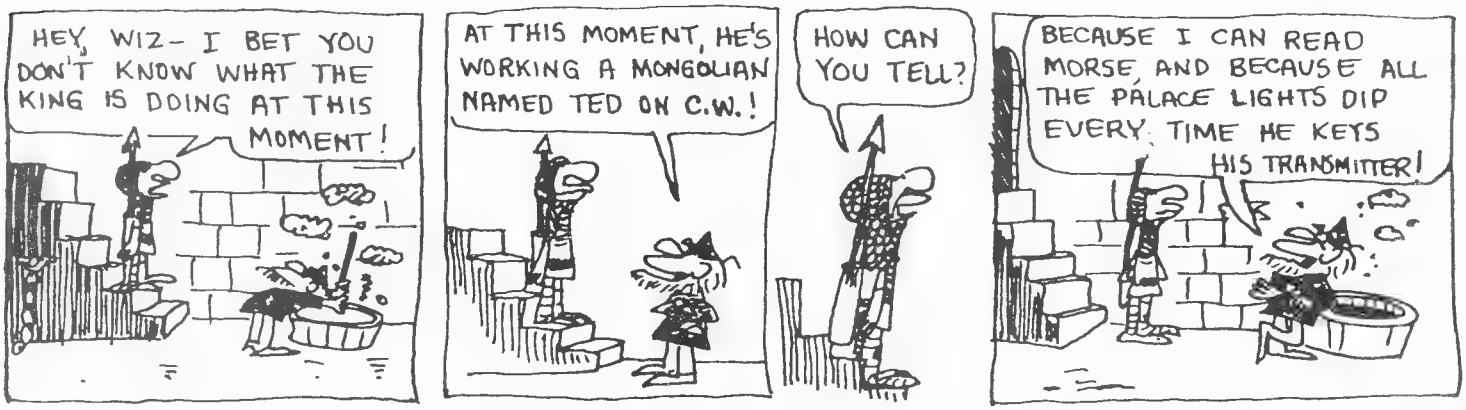
As news is scarce in this month of October, with its early deadline for December issue, it may be appropriate in the absence of any letter this month, to mention that, centres around 6 metres in the main, with 2 metres from time to time, plus a little 70 cm, opportunities do exist for other areas of activity to be mentioned, all I need is for someone to write about the activity.

What about some information on what is going on in the VHF/UHF spectrum with ATV, RTTY, FM, EME, microwaves, special construction projects, antennae, etc. Maybe we can make these columns more interesting, particularly during the periods when operating news is scarce. All you need to do is to write to me at the address shown above, I will do the re-writing or editing if it is needed. These columns will be enhanced by the information you, the readers, are able to supply in support of what I can muster. You must remember I still need to work to keep the wolf from the door, so I don't have unlimited time to be operating. Your help is still needed!

It's December again. With this issue sees the start of my 13th year of writing these columns, the continuation of which has only been possible with the large amount of help received from my many correspondents, some of many years standing. I am indeed grateful for your support. My thanks to the Editor and the Publishing Committee for their continued understanding of my various idiosynchrosies, and to the type setters who have to read my typewriting. But it will be Christmas soon; may I wish you all a happy and safe festive season, with plenty of DX and a new transceiver in the Christmas stocking.

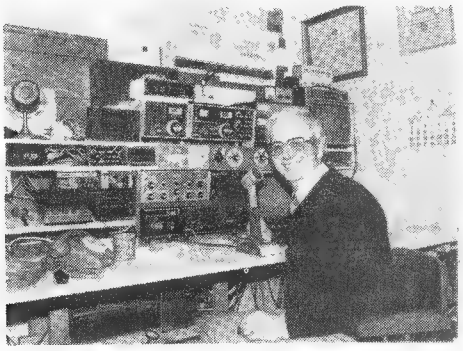
Closing with the thought for the month: "It's a rule of company life: the less important you are on the table of organisation, the more you'll be missed if you don't show up for work."

73. The Voice in the Hills. ■



From the Propagator, August '81

HOW'S DX



Ken J. McLachlan VK3AH
PO Box 39, Mooroolbark 3138

Again October provided excellent DX on the higher bands. Excellent openings were observed on 10m by calling CQ at odd hours.

It is apparent that a lot of people listen or scan the band without calling CQ. I admit that I, too, am a bit lazy, and employ a continuous cassette, which has the desired effect, saving the voice for the desired QSOs.

Proficient DXers are becoming a little "browned off" on trying to find that elusive country which is masked behind either the "woodpecker" or "motorbike" syndrome, self-appointed "policemen", operators who don't possess a "dummy" load, or if they do don't use it, coupled with deliberate QRMers, propagation conditions affected by solar flux and all that jazz, plus many other day to day variances, which are supposed to make life interesting, can make this aspect of the hobby very disheartening.

We as individuals can do little to assist in alleviating these problems. We can refrain from using the recognised DX SSB, calling frequencies of 3.795 (VK equals 3.695), 7.085, 14.195, 21.295 and 28.495 MHz for "rag chewing" and idle chatter generally on top of a DX station.

These frequencies are monitored by avid DXers world-wide for expeditions who have generally spent considerable time, effort and money to get to that rare location, and they should in my opinion be given the privilege of using it as should operators from the much wanted countries. Please give the operators from these countries the courtesy of a free frequency, and maybe this courtesy could brush off on to other amateurs.

As a SSTVer it is found that similar conditions exist, generally due to ignorance that QRM on a SSTV signal and any "plash" will deteriorate the received picture or destroy it. This leads to frustration and a build up of ill-feeling between both operators in their respective modes. To alleviate this, readers of this column can assist by being aware of the internationally accepted frequencies for SSTV, which are 3.670, 7125, 14.230, 21.**360** and 28.680 MHz.

Personally it is felt there is room on the bands for all the different aspects of the hobby.

(I question the viability and accepted practice of establishing "special mode transmissions", i.e. SSTV, smacks in the middle of the busiest phone band we possess. Surely it would be better for all concerned and less interference problems experienced if special modes such as SSTV were relocated around 14.670-14.075 MHz? Food for thought??—Ed.)

KF10/CE0 SAN FELIX

Bob Read WB1GDQ made it to the much wanted island, apparently on his own, which was a let down considering that some 12 operators were scheduled for the visit originally. It is a bit hazy as to why the visit was curtailed abruptly, not even making a 48 hour operation — but at least a few VKs achieved it for a new country. Congratulations.

Father Dave CE0AE has advised that the Chilean authorities will not recognise certain first letters in the suffix as belonging to a particular island under its jurisdiction (i.e. CE0Z Juan Fernandez) — so calls in future will be just CE0. Work it and find out later!

ZL5

Two new operators on McMurdo Base in the Antarctic using the call signs ZL5BA and ZL5GH for the next 12 months.

Operation will be as the workload permits and QSLs via the ZL Bureau. These will be processed when both Alister and George return from their tour of duty in November 1982.

SPECIAL QSL CARD

A special card for the commemoration of the attack on Pearl Harbour will be available to amateurs who make contact on either CW or SSB between the hours of 02.00 UTC December 5th and 8.00 UTC on December 6th this year. Frequencies to watch for SSB are 14.295 and 21.370 MHz, for CW 14.040 and 21.040 MHz. The call sign is KH6SP. QSLs direct to ARS — KH6SP — "Navubase", Hawaii 96860, Central Pacific.

It is believed **SWLs will be catered** for also.

DXCC — ARRL STYLE

Don Search W3AZD, Assistant Communications Manager at Newington, in a letter outlined the current position with some countries and stations which applies to their credit list.

IA0KM

Now accepted for all QSOs but please don't submit cards before 1st January, 1982.

G3JK1/5A

Still awaiting documentation.

9U5JM

Awaiting requested documents.

Cards **not** accepted by credit — unauthorised operations: A6XJA, HP2XBA (prior 1/10/79), K4YT/5R8, VK4KV/D, TG9AA, TG9CH, TH8JM, VR1BE/KH1, XZ5A, XZ9A, 4W2AA, 7Z2AP, 9U5DS, A6 on or after 11/2/79 all Walvis Bay, K1CO/PJ7.

The following were alleged shipboard operations: J3AAE, J3ABD, W0YR/VP2V, WB8HUP/VP2V, ZB2A, ZB2FU, ZB2GM, 604LS.

If you have one of these cards, don't cry, but hold on to it, it may be a collector's item.

BY AGAIN

Tom Wong VE7BC back on business in this much wanted country, but of course will be unable to operate. However, as on previous trips, it is believed he will distribute many more copies of ARRL's Radio Amateurs' Handbook, plus other "goodies" such as small construction kits to the needy. This will further cement the excellent relations which currently exist between the amateur and "budding" amateur fraternity.

Also it is believed Tom will commission five Yaesu transceivers, four Hy-Gain beams and ancillary equipment which will be set up at four selected sites for future use. Two question arise: (1) When? (2) Who is going to be the first VK (that needs it for a new country) to enter it in the log on either CW or SSB?

There will be no prize for this achievement however!

DX JOTTINGS

Wanting a card from 5N0RBB, XV5AA, or HS1AFA? Well try WA7QDG at 5904 Dayton Avenue — No, Seattle, WA 98103. He has all the logs for his expeditions at the new home QTH — so it is worth a try.

Those who worked George FB8WG on Crozet and didn't get the QSL address as his XYL is staying in Corsica during the tour of duty on Crozet. QSL to —

Madame de Marrez,
Santo Severa 20228,
Luri, Corsica Island,
France, Europe.

Incidentally, green stamps are OK and the cheapest method to pay for postage.

Remember Herik FR0FLO, who went touring around the Indian Ocean recently, calling at Europa, Juan de Nova and Mayotte? The total tally of 14,578 QSOs was the score. Quite an impressive effort, and the QSLs are well in hand, he says.

3Y BOUVET

Remember the Glouoso and Juan de Nova Expedition in April last year? Well Dieter DK9KD, according to reports, has organised a trip to desolate Bouvet in January.

Dieter, who is renowned for his ingenuity and know-how, has obtained the licences which are 3Y0A and 3Y0B, but funds are still a problem and financial help is required because transportation alone is in excess of $20,000. QSLs, if they make it, will go to DK9KD and, on past performances, should have a quick turnaround. This is a good one to start 1982 with and let's all hope it comes off. As CW and SSB, plus a 80m through 10m operation is planned.

THE CW BANDS WITH ERIC L30042

160m
KP4KK/DU2, ZL1HY.

80m
JA5CZE, VE1ZZ

40m
DJ9GD, EA7BDL, HL50C, HP1XVY, KH3AB, T12PZ, T2ETA, VE7ZZZ, 4U1ITU, YO4AVR/MM.

20m
G3GJQ/CN8, CP6EE, EA9HG, FK0AD, FM7WU, FY7YE, GU5KJB, HB0NL, H18LC, HK3DDD, J28DM, LU7AMU, ON4VJ/LX, PY1MAG, P29EJ, T30BG, VP9GK, XE3U, ZK2BGD, ZL0AES, 9U5WR

15m
C21N1, EA6DD, HK0BKX, LU8YYO, OA4FW, SV0AA, TG9RB, T30BG, ZK1BD, ZS5MY, 4X6NDT, 8J1RM.

10m
CT1ALR, CX6CW, N7ET/DU6, GJ5DQC, KL7MF, LA3UL, VS6CF, VU2VTM, XE1RV, DL2GG/YV5, Y79YL, ZS6AXM, 4S7MX, UA3XBP/4K1, 4U1ITU.

QSLers OF THE MONTH
FG0GD1/FS, FR0FLO, G4MAE, GD4BEG, GD4KNE, H18MOG, H18PGG, H44MM, KC6MW, KG6RT, LX2BQ, OA4SS, K4FW/VP2K, VP8PK, 5W1DC, 8P6AU.

QSL MANAGERS WHO GAVE SUPER SERVICE
DJ9ZB, I0MGM, I8YCP, W4FRU, W4VDE, WA3HUP

Some stations don't QSL via a Bureau. One of these is LX2BQ, who requires equivalent IRCs, addressed envelope, and the QTH is Box 22, 9 Rue Tudor 6852, Rosport, Gr D Luxembourg, Europe. This is one operator that openly states his stand

QSL ROUTES
H6XJA — PA0LP
G3GJQ/CN8 — RSGB Bureau.
CT2CQ — W4LKM.
FP0GAQ — K8CJQ
FY7YE — W5JLU.
GJ5DQC — DF3JD.
J28DM — F2GA
OY9R — K21JL
T30BG — OE2DYL
T2ETA — OE2DYL
ZL0AES — K1MM
8J1RM — JARL Bureau
5N9AC0/8 — 1V3ACP
9U5WR — SP6FER.

QSLs DIRECT QTHs
EA9HG — Box 513, Ceuta, North Africa.
FB8WG — Madame de Marrez, Santo Severa 20228, Luri, Corsica Island, France.
T30DB — PO Box 494, Betio, Tarawa, Kirribati.
VO2CW — via VE3ICR, 74 Hiland Avenue, St. Catherine's, Ontario, Canada.
ZF1MJ — PO Box 1215, Grand Cayman sl., BW Indies.

SOME STATIONS WORKED IN VK ON SSB

10m
A51PN, BV2B, CR9AN, DK2OC, EA3CUD, F5RV/FC, GJ3DVC, H18PGG, JX7FD, KC6DG, LA7AH, PA0WV, TF3SV, XZ9A, 3B8LH, 4U11TU, 7P8BJ, 8Q7BF.

15m
A51PN, F5RU/FC, FB8WG, GD3KHE, HV3SJ, JX7FD, KC6MM, KP4GN, M1D, OK1MP, OX3BX, OY9R, ST0SA, T19FAG, XZ5A, ZK1BR.

20m
A51PN, BV2B, F5RU/FC, F9MD, FB8WG, H18PGG, JX7FD, LA7WV, OZ3EA, T19FAG, TA1MD, XZ5A, XZ9A, Y23FM, plus many others.

CW QSOs ON THE LOW BANDS WITH MIKE VK6HD
Band's haven't been specatcular.

160m
W1-W0 except W9, KP4KK/DU8, YB9ADE.

3.5 MHz
DL, EA, EA8QJ, FO8DF, G, G1, GM, HB, OH, OK, ON, OZ, SM, SP, UA, UA9, UL7, UP, UQ, VEs, W1-W0, YO, YU, ZS5LB.

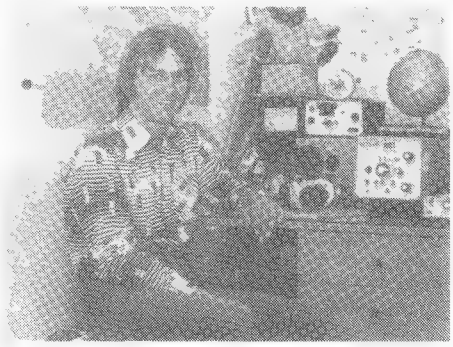
7 MHz
FP0GBG, 9U5WR.

For assistance and information for these notes thanks to L30042, L30820, VK2DXH, VK3PU, VK6HD, VK6IH and VK6NE.

To all readers season's greeting from this QTH and hopes that 1982 brings you those much wanted countries and everything you wish yourself.

73. Ken. ■

FACES BEHIND THE KEY AND MIKE

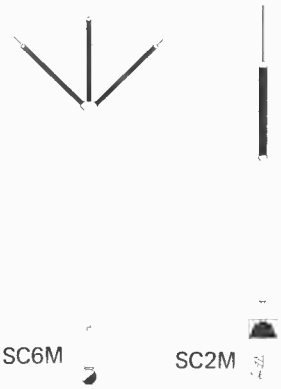


Milan OK1DWC

Taka JA1BWA

Aron EA3CUD

H.F. MOBILE ANTENNA SYSTEM
SC-OO-R SERIES – TRI BAND



SC-OO-R Series
Choice of two masts – 6M or 2M Bumper or guttergrip mount – Single resonators for 80-10M operation. Triband operation without adjustment of antenna.

Communicate with SCALAR

HA600T SERIES
6ft Heavy duty fibreglass whips. High radiating efficiency.

Power: 100W Average
400W P.E.P.

	MHz
HA610T	28 – 29
HA615T	21 – 21.45
HA620T	14 – 14.35
HA640T	7 – 7.15
HA680T	3.5 – 3.70

SCALAR GROUP
20 Shelley Ave.
Kilsyth 3137
VIC. 725 9677
N.S.W. 502 2888
QLD. 44 8024
W.A. 446 9177

Index to Volume 49 — January to December 1981

ANTENNAE

The SLY beam — Try This Feb 27
A Review of Antenna Noise Bridges —
Part 1 Mar 10
Part 2 Apr 9
Large Antenna Gyrating Inhibitor — Tech. Correspondence Mar 39
The Evolution of a 10 Metre Multi-Element Beam Apr 22
An Improved Series R-X Noise Bridge May 10
The Trinity Loop Antenna May 22
The Trinity Loop Antenna — Afterthoughts July 51
The Active Antenna — Novice Notes May 45
A More Complete Antenna Test — Beliefs and Facts June 8
Some Thoughts About Towers July 14
The Parasol Antenna — Try This July 42
Mounting a Quad Antenna Aug 14
An Aluminium Winch Up Tower Nov 8
A Tale of a Tower Nov 24
Developing the HF Beam Dec 6

BOOK REVIEWS

The ARRL Radio Amateurs' Handbook — 1981 Apr 19
Early Radio Wave Detectors by V. J Phillips Apr 19
A Guide to Amateur Radio — 18th Edition RSGB Apr 19
Amateur Radio Techniques — 7th Edition RSGB May 50
QSO JA Now — VK2AHB June 26
Shortwave Propagation Handbook June 27

COMMERCIAL KINKS

Increased Gain for the IC22S Jan 30
Modifications to the Philips FM321 Mar 33

CONTESTS, RULES, RESULTS, AWARDS

Ballarat Certificate Jan 34
John Moyle Memorial Field Day Contest — Rules 1981 Jan 19
Commonwealth Contest 1981 — BERU Rules Feb 33
Mar 33
Pioneer Shire Centenary Award Feb 35
Brisbane Amateur Radio Club Feb 35
1980 Novice Contest Results Mar 33
WAVKCA Awards July-December 1980 Mar 38
WAS (VHF) Award July-December 1980 Mar 38
WAVKCA (VHF) Award July-December 1980 Mar 38
HAVKCA (SWL) Award July-December 1980 Mar 38
DXCC Top Listings December 1980 Mar 38
DXCC Award July-December 1980 Mar 38
Bougainvillea Festival Award Apr 40
Worked Darwin Award Apr 40
Worked VK8 Awards Apr 40
King of Spain Contest Apr 42
Helvetia Contest Apr 42
Ross Hull Memorial Contest 1980-1981 Results Apr 42
State of the Art Contest 1980 Apr 43
Gold Award May 41
North West Award May 41
1980 All Asian Phone Results May 47
Townsville Pacific Festival Contest 1981 — Rules May 47
IV IBERO — AMERICAN Contest May 47
John Moyle Memorial Field Day Contest 1981 — Results May 47
VK-ZL DX Contest 1981 — Rules May 48
IYDP Natural History Award June 36
Begonia Award June 37
DX Widows Award June 37
Australian Novice Contest — Errata June 37
1980 National VHF Field Weekend — Results June 37
VK/ZL/OCEANIA DX Contest 1980 — Overseas Results June 44
Blue Mountains Award July 40
Pelican Award July 40
The Sunshine State "Jack Files Memorial Contest" July 52
IARU Radiosport — Rules July 53
Remembrance Day Contest 1981 — Rules July 53
Dupe Sheet for the Remembrance Day Contest July 54
Cairns Bird-Wing Chapter of the 10-X International Aug 19
Australian Novice Contest Rules Aug 42
Bulgarian CW Contest Rules Sept 33
WAVKCA Award January 1981-June 1981 Sept 43
WAS (VHF) Award January 1981-June 1981 Sept 43
HAVKCA (SWL) Award January 1981-June 1981 Sept 43
VHFCC Award January 1981-June 1981 Sept 43
DXCC Top Listings 30 June, 1981 Sept 43
DXCC New Members January 1981-June 1981 Sept 43
DXCC Amendments 30 June, 1981 Sept 43
Rules for the 1981 Ross Hull Memorial Contest Oct 42
1981 VK Versus The World — CW QRP Contest Oct 42
Townsville Pacific Festival Contest 1981 — Results Oct 43
Power Valley Award Oct 44
Commonwealth Contest 1981 Nov 42
Western Keyboard Bashers' Award Nov 50
RTTY Award Nov 50
John Moyle Field Day Contest Rules Dec 35

EQUIPMENT REVIEWS

A Review of the Yaesu FRG7700 Receiver May 21
The Kenwood TS-530S HF Transceiver Aug 24
A Review of the FT780R Transceiver Oct 14

GENERAL

Cockies Net Second Birthday Jan 26
VK4DO — 57 Years a Radio Amateur Jan 20
Band Plans Jan 14
5m VHF Back in the Wireless Horse and Buggy Days Jan 18
Jamboree of the Air Feb 7
Amateurs in the News Feb 17
A Helping Hand Feb 22
Draft Australian Table of Frequency Allocations Mar 8
Amateur Radio — Where to in the 1980s? Mar 16
Proposed Long Term Objectives for the WIA Mar 17
WICEN Murray River Canoe Marathon — Christmas 1980 Mar 20
Amateur Radio Along the Canning Stock Route Mar 21
WIA Federal Video — Cassette Library Mar 23
Atop Mt. Toolbrunup Mar 24
Woodpecker Located Mar 34
Ron Wilkinson Achievement Award 1980 Mar 39
Vale Gil Miles VK2KI Apr 15
VHF-UHF Band Plans Apr 18
Nuclear Power Apr 21
Band Plans Apr 25
The Importance of Satellite Communications in Developing Countries Apr 26
Victorian Midland Zone Convention Apr 46
The North West Radio Society May 13
Amateur Radio in Japan May 14
National Third Party Amateur Radio Network May 18
And What About Junk Boxes. May 19
Intruder Watch Special May 27
A La Mode May 35
At Liverpool and Districts Amateur Radio Club Field Day — 22nd March, 1981 May 36
Brisbane North Radio Club — John Moyle Field Day May 49
RAOTC May 51
A Large War-Time Transmitter June 13
RFI—EMC—EMI—EMP—EME June 18
Around Australia with Amateur Radio June 19
Operation White Stick June 22
Letter to the Minister July 8
QRI? July 16
AR Special July 20
Executive Report July 21
Dupe Sheet for the Remembrance Day Contest July 54
Victorian Division NE Zone at Wodonga Aug 15
Amateur Radio Operators Keep Australia's Communication Links Open Aug 16
Telecom Australia Museum — Adelaide Aug 18
Close Up Aug 21
Homebrewing a Repeater Site Aug 27
National EMC Advisory Service Aug 37
Visiting a Ham Sept 11
How the Other Half Lives — Two Metres in Asiatic Russia Sept 14
Fox Hunts at 1981 Melbourne Convention Sept 16
A Report on the Activities of Burma Stations XZ5A, XZ9A Sept 17
Reciprocity of AR Licences Sept 20
Hamming in Brazil Sept 44
Amateur Radio Station VK6ACH — Carnarvon Senior High School, WA Sept 45
Decimal Time Oct 9
RSARS Oct 9
WICEN at the 1981 Sydney Airport Exercise Oct 12
A Global Navigation System Oct 15
Chitary Moriyama JH3THP Oct 18
New Zealand ART Conference — 1981 Oct 29
National EMC Advisory Service Oct 31
What Should You Know About Burns? Nov 16
CW Procedures and Techniques Nov 17
Planning for Australia's Domestic Satellite System Dec 16

NOVICE

RF Power Control for the FT7 Feb 29
A Note on VSWR Feb 29
A Wire Beam for Novice Operation Apr 43
Resistors May 43
Fixed Capacitors May 43
The Active Antenna May 45
Peak Envelope Power — What is it? June 40
The Basics of Amplitude Modulation July 49
Catching Your First DX in a Scientific Way Aug 22
Australian Novice Contest Rules Aug 42
Low Cost Loop Sept 39
Simple Meter Calibration Sept 39
Charging Nickel Cadmium Batteries Sept 40
A Simple Zener Diode Tester Oct 46
A Crystal Tester Oct 46
RMS Power Nov 52
Questions and Answers Dec 45

RECEIVERS

Direct Conversion Receiver for 3.5, 5 or 7 MHz Aug 11

RTTY

A Solid State Keyboard for RTTY Jan 15
VK2RTTY News — An Insight June 16
A Beginners' Guide to RTTY July 10

TECHNICAL

A New Frequency Counter Jan 8
Home Building Jan 17
World-Wide Communications from Hand Held and Man Pack Transceivers —
Part 2 Jan 22
Part 3 Feb 13
Part 4 Mar 19
An Automatic CQ Caller Feb 9
IC22S on Marine Frequencies May 33
Crowbars and SCRs June 14
A Practical VFO and Buffers to Operate Crystal Controlled CB Units on 10m Sept 10
Solar Cells Sept 12
Post World War II Army Radio Set Sept 13
Explanatory Information on the New Method for Designating Emissions Sept 26
A Simple Drain Dip Oscillator Oct 20
A New Repeater Site, Part 2 Nov 18
Active Short Monopole Receptor Dec 48

TRANSMITTERS AND TRANSCEIVERS

Convehsion Details for some AWA Carphones . . . . . June 41
Homebrewer's Linear Amplifier . . July 28
A Practical VFO and Buffer to Operate Crystal Controlled CB Units on 10m .... Sept 10
QRP Sol'd State Linear Amplifier for HF Oct 7
A State of the Ark Transverter for the New Amateur Bands . . . Oct 38
QRP CW Transmitter with Break-in, Part 1 Dec 12

TRY THIS

The SLY Beam E . . . Feb 27
Curing TVI — See Also Errata June 1981, page 7 . . . . . May 42
Curing TVI — Errata . . . . . June 7
Antenna Hint . . . . . June 42
Low Cost Diodes . . . June 42
Super Zener . . . . June 42
Super Clipper . . . . . June 42
A Homebrew UHF Signal Generator . July 41
The Parasol Antenna . . . . . July 42
Full Break-In Capability (QSK) for the 520S . . . . . Sept 35
Novel Phase Lock Circuit . . . Dec 42

EMC

(Electro Magnetic Compatibility)

If radio frequency interference is causing you a problem you are reminded that — "Advice on all types and aspects of interference (PLI, TVI, AFI, etc.) is available from the National EMC Advisory Service".

FORWARD DETAILS TO VK3QQ, Federal EMC Co-ordinator, QTHR.

A Call to all holders of a

NOVICE LICENCE

Now you have joined the ranks of Amateur Radio, why not extend your activities?

THE WIRELESS INSTITUTE OF AUSTRALIA
(N.S.W. DIVISION)

conducts a Bridging Correspondence Course for the AOCP and LAOCP Examinations.

Throughout the Course, your papers are checked and commented upon to lead you to a SUCCESSFUL CONCLUSION.

For further details write to:

THE COURSE SUPERVISOR, W.I.A.

P.O. BOX 123, ST. LEONARDS, N.S.W. 2065

SPOTLIGHT ON SWLing

Robin Harwood VK7RH

5 Helen St. Launceston, Tasmania 7250

Another year has drawn to a close, and it is about time we evaluate the shortwave scene over the twelve months and try and see if we can predict what 1982 has in store for us.

It has been quite evident that conditions during 1981 have been variable, with frequent ionospheric disturbances, e.g. solar flares and magnetic storms. Performances on the higher frequencies, particularly the 11 and 13 metre broadcasting bands, have dropped off quite sharply. The 100 watt HCJB transmission on 26020 kHz is very rarely observed these days. Similarly, propagation on the 10/11 metre bands has also deteriorated markedly. This is to be expected and there will be frequent disruption to communication after the sunspot peak in late 1979/early 1980.

Earlier in the year it was apparent that several international broadcasters were going to curtail their programme output due to financial stringencies imposed by their administrations. However, with the international situation altering, especially in eastern Europe and the Middle East, there has been a noticeable increase in broadcast hours, particularly from the larger organizations such as the VOA, Radio Moscow, Deutsche Welle, etc., while the voices of the smaller nations are also being raised to present their points of view on the international frequencies.

It is also becoming obvious that many stations are increasingly coming under government control and censorship, reflecting official views and couched in cliches. Those independent stations outside of governmental restrictions are getting fewer, but their audience is increasing, so much so that they are unable to process the flood of mail that is coming into the station.

In Europe, where the State has virtually a monopoly on broadcasting, there has been an emerging "underground" radio broadcasting scene. Thousands of unofficial stations have come on the air, in Italy and the Benelux countries particularly. Technically pirates, they are able to avoid the law due to loopholes in the legislation in the respective countries, and the licensing authorities are undermanned and are otherwise engaged in other more serious enterprises than pirate hunting.

Fortunately this unofficial radio scene has been largely contained on the FM band. I have myself observed the situation in Italy, whilst in Europe in 1979. My transistor radio was severely cross-modulating on the FM bands in Venezia because it couldn't cope with the 40 + stations active in that region alone. All one had to do in 1979 in Italy was to go to the nearest police station and register your station's frequency and go on the air! However, I believe this has since been modified and tightened somewhat.

Of course there have been problems with the mushrooming growth of this phenomenon, with serious interference to other telecommunication users. It has been reported that the Flight Control Centre in Athens (Greece) was unable to communicate with arriving and departing aircraft because an unofficial station's transmitter was emitting parasitics on to the Flight Control's channel. The official monitoring services were unable to track down the source of the transmission, despite exhaustive direction-finding measurements. So the job was handed over to the Secret Police, who very rapidly silenced the transmitter in a matter of hours using non-technical methods!

Another growth area in international broadcasting over the past 12 months is the clandestine programme outlets. This is directly attributable to the tensions and intrigues apparent in world politics at the present time. It should be pointed out that clandestine broadcasts are different from

THE VK3BWW FORMULA FOR DX SUCCESS!!

HIGH QUALITY AT LOW COST

BEAMS

3 EL 10 & 11m	$69.00
3 EL 15m	$77.00
3 EL 20m	$149.00
6 EL 6m	$102.00

DUOBANDER
3 EL 10m, 3 EL 15m **$139.00**
Prices include Gamma match

Our beams are easy to assemble and adjust. Entirely **NEW** CONCEPT — **NO** NUTS OR BOLTS.

Spare parts, elements, booms and gamma matches available.
Plus Freight

For further information
PLEASE RING (03) 366 7042

VK3BWW
WERNER & G. WULF
92 LEONARD AVENUE
ST. ALBANS, VICTORIA 3021

unofficial radio, in that they utilize the resources of official outlets who, being sympathetic to their cause, give material and financial backing to their activities. Their frequencies are variable, naturally, because administrations generally take countermeasures, and emit jamming noises on the same frequency. Unfortunately, those who occupy nearby channels get the backwash from these jammers affecting their programmes as well.

Among the new clandestine outlets noted over the year has been the following:— The Voice of Re-Unification (N. Korea), the Voice of Malayan Democracy (S.-E. Asia), R. Libertade Costa Rica, as well as numerous outlets in the Middle East, Latin America and ,surprisingly, Florida. Interestingly, the US Government is planning to open a clandestine Radio Free Cuba towards the end of the year.

With events in Eastern Europe being prominently in the news during the year, it is therefore not surprising that the official Radio Free Europe/Radio Liberty has come under scrutiny during the year, with attempts to silence its voice by means of terrorist attacks, as well as the conventional jamming of their programmes from within their target areas. It is highly probable that funds and facilities will increase for RFE/RL. Yet I predict that facilities for the production and/or transmission of their programming will possibly be moved into safer locations in Europe and the north-western Pacific.

The presence of OTHR pulses has not diminished either in 1981, although the duration of the pulses on any given channel has been shortened. One interesting report that I noticed in the press is that NATO has been experimeting with a new microcomputer-based transmission system, involving the alteration of the signal frequency at an extremely high speed, so that only a fraction of the information will be sent on any given channel over a one second pulse. All that will be observed will be a plip or plop lasting a tenth of a second.

Another method currently being employed by many utility users on the VHF/UHF regions is encoding the information digitally, the combination only being known to the receiver fitted with the digital synthesizer. This has an advantage in that many services can share the channel, yet the traffic remains private to that one service.

During the year the appearance of a new breed of receivers emerged. This of course was the Sony ICF 2001. By means of keyboard entry, all that is needed is for the frequency to be punched in. The retention of the frequency in memory was also made possible, thus eliminating the time-consuming process of searching for your favourite channel. As more of these became available, the price per unit dropped. I am sure that more manufacturers will produce receiving equipment along these lines, for it is clear more people will want to listen to independent sources of information than is at presently available through conventional outlets.

In amateur radio during this period, there were no really significant developments. Increasingly the hobby is becoming fragmented into smaller interest groups, and I predict that it will be difficult in the days ahead to get a consensus of opinion or unity, as each group will narrowly be concerned in their spheres of interest.

It is noteworthy as well that some of the SWL organizations in the South Pacific have formed a Council to promote the hobby, together with the organization of inter-club co-operation in contests, conventions, etc. This South Pacific Association of Radio Clubs (SPARC) is made up from the Southern Cross DX Club and the Down Under DX Circle in Australia, and the New Zealand DX Radio Association (NZDXRA) and NZ DX Radio League. This regional council will be affiliated with AUARC in the USA and the European DX Council.

Another development has been the experiments by two broadcasters with alternative modes. Kol Israel continued to slow scan TV broadcasts, but the results were far from satisfactory. Because of the limited nature and scope of the audience to intercept the signals, I am reliably informed that Kol Israel has abandoned them permanently.

The second experiment of note has been the Radio Nederland transmissions of computer programme data. It had limited success mainly due to some propagational anomalies and multipath echoes bringing up reading errors in the feeding of the information to the computer. Those in Europe were able to retrieve the programme because these effects didn't show up, as they did in other parts of the globe. Another problem was the cassette interface with the computer. The variation of speed between the record and playback is sufficient to cause errors, as users will find out when they feed their programme back into the computer. I also believe that Radio Nederland is planning to have further computer experiments with other models during the January editions of Media Network.

In conclusion, may I extend my wishes for a happy Christmas and hope that the new year brings all that you desire.

73. Robin L. Harwood. ■

THE
WIA
BOOK
When is it
?

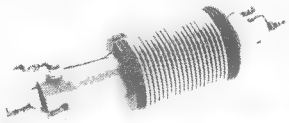
the OLD reliable™ REYCO ANTENNA TRAPS

Makes your antenna MULTIBAND
- **Precision frequency paired**
- **Have 500lb. pull-apart strength**
- **Thoroughly weatherized**

What does a trap do?
At resonance the trap is an "open circuit" and cuts your dipole to resonant length at that frequency.

Complete instructions are furnished.

Model	Resonant at
KW10	10 metres
KW15	15 metres
KW20	20 metres
KW40	40 metres



Communicate with SCALAR

BALUN W2AU the BIG signal®

Worlds leading Ham Balun
For over 10 years, the preferred balun of Hams, and professional communications around the world.
- **Original lightning arrestor**
- **600lbs. pull as an insulator**
- **completely weatherized.**

Your rig deserves a W2AU.
Less TVI on your coax, balances antenna current distribution for maximum gain, guards your feedpoint from weather and protects transmitter from lightning strikes.

Full frequency:
3—40 MHz

FOR USE WITH:
D POLES
FOLDED D POLES
INVERTED VEES
QUADS
YAGIS

SCALAR GROUP
20 Shelley Ave.
Kilsyth 3137
VIC. 725 9677
N.S.W. 502 2888
QLD. 44 8024
W.A. 446 9177

WICEN

R. G. HENDERSON VK1RH,
Federal WICEN Co-ordinator

I recently received several questions on WICEN policy from a regional co-ordinator and as the answers are of importance to all WICEN operators I will answer them through this column. Where possible I will relate my answers to recorded WIA policy — where that is not possible and the matter is considered important by Divisions they may wish to raise it at the next Federal Convention.

Q1: What is WIA policy concerning third party traffic on Amateur Bands?

So as to facilitate WICEN exercises and operations the long term WIA aim has been to achieve third party traffic privileges not unlike those prevailing in USA. Several Federal Convention motions record this action. At the 1981 Convention the desirability of third party message forms following the general format of the emergency services forms was strongly recommended. AR has since published message form layout for general use. See August 1981 AR, page 38.

Q2: What is WIA policy regarding third party networks?

Having achieved third party traffic privileges (be it still limited at present) the WIA believes it natural that individuals and groups might wish to pass traffic in accordance with the agreed guidelines. Unlike the ARRL the WIA has set up no official WIA traffic networks.

WICEN opinion is that third party traffic networks which are operated within the agreed bounds (which hopefully will be included in the next reprint of the Handbook!) provide a traffic handling service for individuals which is not available through WICEN.

Remember WICEN provides a communications service for the counter-disaster authorities not the individual. WICEN is activated at the request of these authorities.

Q3: Can all these services co-exist peacefully?

As Federal WICEN Co-ordinator I see three levels of involvement in community services by the amateur: The first is full SES (or VRA) involvement, probably as a communications officer/instructor/operator for a SES group. This calls for a significant commitment of time and an awareness of the constraints under which they operate. Problems which should be avoided are using amateur equipment on SES frequencies (amateur gear is not type approved) maintaining or repairing SES equipment without the necessary valid service technician qualifications and using amateur gear and frequencies in preference to existing SES equipment. Nevertheless SES needs volunteers and I would expect a number of amateurs to become so involved.

The second level is WICEN, that is as trained licensed operators with equipment available to assist the counter-disaster authorities in an emergency. The average WICEN operator is willing to work in an emergency but not to be exercised every weekend on community aid communications. The implications of compensation, authenticity and liability are important.

The third level involves third party networks providing message communications for the general public, normally running at low key but assuming importance in times of public communications breakdowns. Here the liability of the operator is not defined nor have the industrial implications (e.g. strike breaking) been subject to test. Some concern has been expressed that third party activities may detract from the "respectability" of amateur radio and a fine balance will need to be achieved.

So in a long-winded way I have said that all three can co-exist and indeed there is a place for each in the community.

Q4: What are the third party regulations?

We are advised by DOC that although new regulations have yet to be arranged they will be along the lines of those applying in the USA but will not include "phone patching" (at the time of writing!).

"The transmission or delivery of the following amateur radio communications is prohibited:

- International third party traffic except with countries that have assented thereto.
- Third party traffic involving material compensation either tangible or intangible, direct or indirect to a third party, a station licensee, a control operator or any other person.
- Except for any emergency communications as defined in this part third party traffic consists of business communication on behalf of any party. For the purpose of this section, business communication shall mean any transmission or communication, the purpose of which is to facilitate the regular business or commercial affairs of any party."

ACCEPTABILITY

WICEN suffers from a continuous identity crisis in achieving acceptability by the counter-disaster authorities. At the national and State levels WICEN has been written into most disaster handbooks and communications plans but at the working level acceptability and the consequent activations can only be achieved by hard and continuous liaison.

The harsh reality can be expressed in this hypothetical example: Would you as a harrassed police sergeant under pressure and in charge of a local disaster have confidence in an unknown amateur operator (perhaps slightly scruffy in appearance) who appears in a "beat up" car bristling antennas and offers his services? Obviously no, so liaison must be made before the disaster, capabilities established and mutual respect achieved.

Ponder the thought that third party traffic networks are also suffering an identity crisis and are striving to achieve respectability with their fellow amateurs by means of communtiy service. ■

ROATC

Considering the number of members who check in to the two nets on the first Monday of each month, the first two of the pilot QSO parties arranged in conjunction with the New Zealand Old Timers' Club were poorly supported in the number taking part and in the number of logs submitted.

As there seemed to be some difference of opinion in VK and ZL about contacts made with a station on SSB, and then again on CW, it was agreed that logs would be re-scored on the basis of one contact per station on either mode, but not on both.

3.5 MHz

8 VK and 3 ZL logs submitted, VK3XB, CW, 360 points, being the leader.

7 MHz

10 VK and 6 ZL logs submitted, VK3XB 945, VK3KS 945, both CW/SSB, leaders.

The third contest on 14 MHz in September was better supported, with 20 VK and 6 ZL logs submitted.

Call	Mode	QSo	Score
VK3XB	CW/SSB	26	1300
VK3KS	SSB	26	1300
VK6HC	SSB	22	880
VK2HQ	CW/SSB	17	680
VK6MG	CW/SSB	17	595
VK2UX	SSB	14	560
VK5APW	SSB	14	490
VK3LC	CW/SSB	19	475
VK3FC	CW/SSB	13	455
VK3PR	SSB	13	390
VK3UJ	SSB	11	385
VK3RJ	CW	14	350
VK5RK	SSB	11	330
VK7BJ	SSB	9	270
VK7RY	CW	8	200
VK3YW	CW	8	160
VK3HC	SSB	8	160
ZL3AV	CW/SS	18	630
ZL2AB	CW/SSB	15	450
ZL2US	CW/SSB	17	425
ZL4ID	SSB	13	390
ZL2BU	CW	8	80
ZL2WL	SSB	5	50

Ray Jones VK3RJ and Dan Wilkinson ZL2AB were clear leaders in the age stakes!

Those who took part voted the tests a good way "to learn something about other OTs", but the lack of contestants made the going rather hard and it is thought that no one saw out the full time of four or six hours (14 MHz). It was good to hear and contact two USA members of our club, W6GTI and W6THN, who burned a lot of midnight oil to take part.

Present thinking, subject to arrangement with the ZLs, is for a party on 14 MHz in early March and for a September one on 7 MHz with perhaps a shorter duration than in 1981.

Any comments would be appreciated.

REMEMBER — Monthly nets:First Monday 0000Z, 7120 kHz; 0200Z, 14150 kHz.

John Tutton VK3ZC. ■

CONTESTS

Reg Dwyer VK1BR
PO Box 236 Jamison 2614

CONTEST CALENDAR

December

5/12/81-10/1/82	ROSS HULL VHF	AR 10/81
4/6	ARRL 160m CW	CQ
12/13	ARRL 10m PHONE/CW	CQ

January

10	ROSS HULL VHF	AR 10/81
9	"73" 40m PHONE	
10	"73" 80m PHONE	
16/17	"73" 160m PHONE	
23/24	WHITE ROSE SWL CONTEST	
29/31	CQ WW 160m CW	

February

6/7	JOHN MOYLE FIELD DAY 6 AND 24 HOUR	AR 12/81

SCORING FOR ALARA CONTEST

Points

Phone

3 points for ALARA member.
5 points for ALARA Club station.
1 point for non-member, YL or OM.

CW

Double all points for CW contacts.

SWL

3 points for ALARA member and 1 point for non-member when in contact with an ALARA member.

Logs

Single log entry. Logs to state time, date, band, mode, call sign worked, report and serial number received, report and serial number sent and name of station worked. Logs also to show CLAIMED POINTS, full name of operator, call sign of operator and full address and to be signed by the operator. No logs will be returned. Logs must be legible, either typed or printed, no carbon copies. Logs must be received by the Contest Manager by 14th February, 1982.

Contest Manager

Margaret Loft VK3DML,
28 Lawrence Street,
Castlemaine, Victoria 3450, Australia.

Certificates

Certificates will be awarded to the following:—

Top score ALARA member in each country and VK call area.
Top score non-member YL in each continent.
Top score non-member OM in each continent.
Top score SWL in each continent.
Top score VK Novice.

Unfortunately the details of this contest arrived too late for publication, but we now include the scoring system for those of you who entered.

FAMOUS AMATEUR MICROPHONE
NOW AVAILABLE IN DUAL IMPEDANCE
SHURE MODEL 444-D

Microphone Features:
- High-output, durable, totally reliable CONTROLLED MAGNETIC cartridge.
- Response tailored for speech intelligibility.
- Switch selectable high or low impedance.
- Normal/VOX switch on microphone.
- Double-pole, double-throw, Million-Cycle leaf-type push-to-talk switch with momentary or locking switch bar.
- Three-conductor, one-conductor shielded coiled cable.
- Cable and switch arranged for instant connection to grounded or isolated transmitter keying.
- Rubber feet keep microphone from slipping.
- Height adjustment for operator comfort.
- Strong ARMO-DUR case impervious to rust and corrosion

PRICE: $109

WILLIAM WILLIS & Co. Pty. Ltd.
PHONE: (03) 836 0707
98 CANTERBURY ROAD, CANTERBURY, VIC., 3216

Introducing MIRAGE Communications Equipment
AS REVIEWED IN AR, MAY 1980

FEATURES:
- Built-in Receive Preamp
- Adjustable delay for SSB
- Remote control operation with optional RS-1 Remote Head
- 1 to 2 Watts in — 15 to 30 Watts out — Excellent for HTs
- Automatic internal or external relay keying

SPECIFICATIONS

Frequency Range		144 to 148 MHz
RF Power In		200 mw to 15 Watts
RF Power Out		80 Watts nom. (10 in - 80 out)
Modes		SSB, FM and CW
Receive Preamp	10 db gain min.	2.5 db ± .5 db noise figure
DC Power		13.6 VDC 10-12 Amps
Size Weight		5.375" x 3" x 8", 3 lbs.

WARRANTY ON ALL MIRAGE PRODUCTS 5 YEARS (1 year RF Power Trans.)

B108 2 METER AMPLIFIER
10W IN — 80W OUT

Amateur Net $249

DUAL PURPOSE — H.T.s or Transceivers

B 23	2 Metre Amplifier	2 W in, 30 W out	$119
B 1016	2 Metre Amplifier	10 W in, 160 W out	$369
B 3016	2 Metre Amplifier	30 W in, 160 W out	$309

Average and Peak Reading Wattmeter/SWR

Model MP1	HF	$165
Model MP2	VHF	$165

ATN ANTENNAS
56 CAMPBELL STREET, BIRCHIP, VIC., 3483
PHONE (FACTORY) (054) 92 2224 (OFFICE) (054) 92 2264

John Moyle Memorial Field Day Contest—Rules 1982

Amateur operators and Short Wave Listeners are invited to make this contest, held in the memory of the late John Moyle, a huge success. Contestants may participate either as individuals or as part of a group. There are two divisions in this contest. The first is for 24 hours continuous operation, and the second for any continuous period of 6 hours. Either period must be within the 26 hours available.

CONTEST PERIOD

From 0400Z 6th February, 1982, to 0600Z 7th February, 1982.

OBJECTS

The operators of portable field stations or mobile stations within the VK and P2 call areas will endeavour to contact other portable, mobile or fixed stations in VK, P2, ZL and foreign call areas on all bands

CALL AREAS

Shall be defined as:—

(a) Within VK/P2: VK1, VK2, through VK0.

(b) Outside VK: Lord Howe (VK2), ZL and foreign countries

RULES

1. In each division there are 8 sections.

(a) Portable field station, transmitting phone.

(b) Portable field station, transmitting CW.

(c) Portable field station, transmitting open.

(d) Portable field station, transmitting phone, multi-operator.

(e) Portable field station, transmitting open, multi-operator

(f) VHF portable field, or mobile station, transmitting.

(g) "Home" transmitting stations.

(h) Receiving portable and mobile stations.

2. In each division, 24 or 6 hours, the operating period must be continuous.

3. Contestants must operate within the terms of their licence.

4. A portable field station must operate from a power supply which is independent of any permanent installation. The power source must be fully portable, i.e., batteries, motor generators, solar panels, etc.

5. No apparatus may be set up on site more than 24 hours before the contest.

6. All amateur bands may be used, but cross band operation is not permitted.

7. Cross mode is permitted, but note Rule 21.

8. All operators of a multi-operator station must be located within approximately an 800 metre diameter circle.

9. Each multi-op. transmitter should maintain a separate log for each band. A 2 FM rig may be separate from 2 AM or SSB rig, but note Rule 11. A separate QSO number series is required for each band.

10. All multi-op. logs should be submitted under one call sign.

11. Only one multi-op. transmitter may operate on a band at any one time.

12. RS or RST reports should be followed by serial numbers beginning at 001 and increasing by one for each successive contact.

13. **SCORING FOR PORTABLE FIELD STATIONS AND MOBILES.** Portable field stations and mobiles, outside entrant's call area — 15 points. Portable field stations and mobiles within entrant's call area — 10 points. Home stations outside entrant's call area — 5 points. Home stations within entrant's call area — 2 points.

14. **SCORING FOR HOME STATIONS.** Portable field stations and mobiles outside entrant's call area — 15 points. Portable field stations and mobiles within entrant's call area — 10 points.

15. Portable field stations may contact any other portable field station twice on each band and mode (10-160) during the period of the contest provided that at least 4 hours elapse after the previous contact with that station on that band and mode.

16. Stations may be worked repeatedly on 52 MHz and above providing 2 hours have elapsed since the previous contact on that band and mode. Note that FM, AM, SSB and any other voice modes are grouped together as PHONE.

17. Operation via active repeaters or translators is not acceptable for scoring.

18. All logs shall be set out under headings of date-time in GMT, band, emission, call sign, RST sent, RST received and points claimed. List contacts in correct sequence. There must be a front sheet to show — name, address, division, section, call sign, call signs of other operators, location, points claimed, equipment used and power supply. You must also certify that you have operated in accordance with the rules and spirit of the contest.

19. Certificates will be awarded to the highest scorer of each section of the 6 hour and 24 hour division. The 6 hour certificates cannot be won by the 24 hour entrants. Additional certificates will be awarded for excellent performance.

20. Entrants in sections a, b, c, d, e and f must state how power for transmitting is derived

21. All CW-CW contacts count double. Cross mode contacts count single.

22. Logs to be postmarked no later than 28th February, 1981, and sent to FCM, Box 1065, Orange 2800.

RECEIVING SECTION

This section is open to all short wave listeners in VK and P2 call areas. Rules are as for transmitting stations, but logs do not have to show report and serial number of the second station. Logs must show the call sign of the portable or mobile station heard, the report and serial number sent by that station, and the call sign of the station called. Scoring is as shown in Rule 14 for home stations. A station calling CQ does not count. Portable and mobile stations, which must be listed in the left hand call sign column of your log, alone count for scoring. Stations in the right hand column may be any station contacted. A certificate will be awarded to the highest scorer of each of the 6 and 24 hour divisions, individual or multi-operator entries. Certificates will be issued for excellent performance.

The decisions of the FCM are final and no correspondence will be entered into. ■

COMMENTS

After publishing the request for comments on the proposed change of date for the contest, I have received numerous replies in answer.

The comments from the majority are in favour of not changing to May or July because of the poor weather conditions in southern VK, which would severely hamper the efforts of the VHFers to gain the heights of snow clad peaks for their propagation together with other winter problems.

The decision has to be announced now to allow us all sufficient time to prepare for the contest. Therefore, 1982's John Moyle Field Day will be held on February 6th and 7th, which is the usual time of year. The rules for the 1982 contest are also in this edition.

Many thanks to all who commented and best of luck in the contest.

73. Reg. ■

EDUCATION NOTES

Thank you to all those who have sent me comments or thoughts on education. I may not always have time to answer all individually, but I do appreciate hearing from you and have collected many new ideas.

I hope those of you who used the sample Novice exam papers found them useful. Once again I would appreciate comments from anyone interested. I still have copies of Morse exam tapes from DOC at both 5 and 10 w.p.m. If you would like copies, please send me a blank tape before December 12th, as I will not have access to copying facilities over the holiday period.

While still on exams, the November AR listed sections of the Regulations Handbook which have been declared non-examinable. This change will operate from the February exams. Of course this does *not* mean that these regulations do not apply any more, just that candidates will not be asked questions about them.

I have recently been asked to provide lists of reference material for each section of the syllabus at each level. This would seem to be a very useful idea. I know I have my own preferred references, but there are probably a lot of very good sources of information which I have not found yet. How about letting me have your reading lists, especially of useful articles in magazines which might be held at club rooms and available for loan or copy, and I will try to put them all together. The completed list could then be circularised or perhaps serialised in AR for next year's classes.

I am gradually amassing a collection of both Novice and AOCP test questions. These could be useful for class instructors or students who are trying to work through on their own. I would be pleased to exchange sets of questions with anyone interested. I hope to have a trial AOCP paper ready for use by early January.

A final thought for clubs and classes. How long is it since you invited a member of your local ambulance service to give you a talk and demonstration on resuscitation techniques? Make a booking for next year. Make it a night when members can bring along family or friends — the ones who might some day have to try to do the reviving. It can be a night well spent.

73. Brenda VK3KT. ■

Confucius XU4CH say:

A diplomat is an OM who thinks twice before he says nothing on 80 metres.

☆

When it comes to get in on a band opening, he who hesitates — is a SWL.

☆

Confidence is the feeling you had just before you found out you were outside of the band.

CLOSE-UP

A RADIO ACTIVE FAMILY

The photograph shows the Charles family of Hyde Park, S..A

Back Row (left to right): son Kim VK5KIM 1981 (VK5NKC 1978), OM Ted VK5YQ 1935 (VS2BF 1946), son-in-law Graeme VK5ZGE 1981 (Ernabella).

Front Row: XYL Joy VK5YJ 1981 (VK5NRQ 1978), daughter Joyanne VK5KJH 1981 (VK5PJH 1980).

Ted Charles, who started it all, says his last contribution to AR was in 1948 — glad to have you back, Ted!

Ted's 1935 AOCP examination paper is also reproduced. ■

COMMONWEALTH OF AUSTRALIA

POSTMASTER-GENERAL'S DEPARTMENT.

AMATEUR OPERATOR'S CERTIFICATE OF PROFICIENCY.

SOUTH AUSTRALIA. JANUARY, 1935.

THEORY.

TIME ALLOWED - 2 hours.

(1) What is an Accumulator?

(b) Detail the action you would take to keep the Accumulator always in a state of maximum efficiency.

(2) (a) Give ohms law for ascertaining voltage, current and resistance.

(b) Suppose you found it necessary to use a 12 volt source for supplying energy for the filaments of a 4 - valve receiver with 6 - volt valves. How would you do it without employing a resistance? (State your reason and show your working.)

(3) Explain with the aid of graphs the theory of the 3 electrode Vacuum Tube as -

(a) A detector and

(b) An Amplifier

(4) (a) What is meant by the term "Push Pull" as applied to wireless circuits?

(b) Give a diagram of a low powered transmitter employing such an arrangement.

(5) Sketch a radiating system for use on 40 metres. Show all lengths, distances etc., and explain how such are determined.

(6) What is meant by the terms Class A; Class B;. and Class C; as applied to amplifiers?

(7) Why is an electron-coupled frequency meter to be preferred to other types? Give reason for your answer.

REGULATIONS.

(1) What are superfluous signals and what regulations govern their transmission?

(2) What signals would you transmit in acknowledging receipt of a distress message?

(3) Give the abbreviated signals for the repetition of figures.

--oOo--

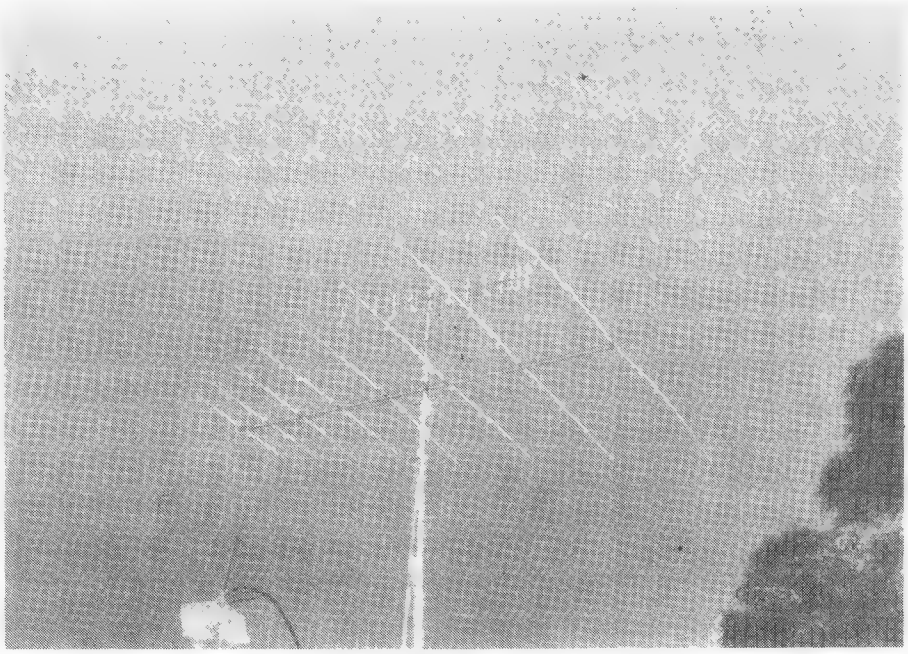
AROUND THE TRADE

ATN COMMERCIAL GRADE LOG PERIODIC HF ANTENNAS

ATN manufactures a range of HF, wide band log periodic antennas designed for amateur and commercial users. For example, the ATN 13-30-8 is an 8 element that covers continuously from 13 to 30 MHz, including new WARC frequencies, CB, 20 metre, 15 metre and 10 metre amateur bands, plus a multitude of commercial overseas broadcast services and all on an 8.5 metre boom. This is a true LP type as are many others in this series.

ATN's low loss and tough insulators space the elements above the boom for optimised performance which ensures correct, simple and straightforward cross-over phasing between adjacent element feed points. ATN HF LP antennas are supplied with a 2 kW PEP balun and are constructed of Australian produced tubing in 6063-T81 temper. Elements are swaged and tapered and the longer elements have positive rake to eliminate unsightly sag. The antennas have a full 12 months warranty.

For further details on all models contact ATN at 56 Campbell Street, Birchip 3483, phone (054) 92 2264, or agencies: Vic. — (03) 873 3939 and 789 3412; Tas. — (002) 47 6674, (003) 31 7075; W.A. — (09) 328 9229; S.A. — (08) 47 3688; Qld. — (07) 397 0808. ■



ATN 13-30-8 antenna.

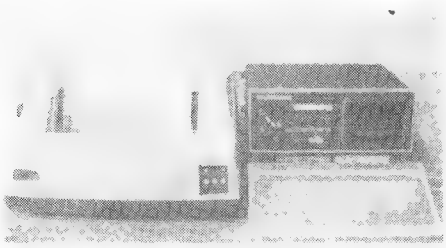
TELEREADER CWR685 COMMUNICATIONS COMPUTER

CW Electronics have released the Telereader CWR685 communications computer. This unit incorporates an internal CRT display and provides for reception and transmission of standard 5 unit baudot code RTTY and ASCII as well as as providing a flexible Morse sending and receiving unit.

The unit works off a 13.2V 1.6A supply, so mobile RTTY is possible.

The Telereader is a compact unit with the main display unit and separate keyboard.

Further details and supplies may be obtained from CW Electronics, 416 Logan Road, Stones Corner, Brisbane. Phone (07) 397 0808. ■



Telereader CW R685.

BRIGHT STAR CRYSTALS PTY LTD

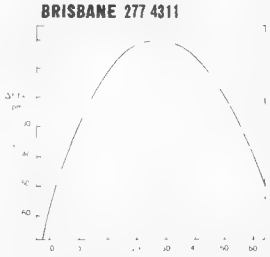
35 EILEEN ROAD, CLAYTON, VICTORIA, 546 5076
(ALL MAIL TO:— P.O. BOX 42, SPRINGVALE, VIC. 3171)

INTERSTATE AGENTS
- R.W. ELECTRONICS ADELAIDE Phone 46 4571
- J. E. WATERS PTY. LTD. SYDNEY 666 8144
- DILMOND INSTRUMENTS HOBART 47 9077

B.S.C. TELEX AA36004

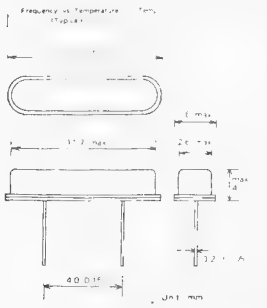
WATCH CRYSTALS

- WESTEST ELECTRONICS PERTH 337 6393
- FRED HOE & SONS PTY. LTD. BRISBANE 277 4311



SPECIFICATIONS

1. Nominal Frequency	32 768 KHz
2. Frequency Tolerance	+30 ppm/28° +1°C
3. Drive Level	1μW max.
4. Series Resistance	31.0 kOhms max
5. Q Factor	40,000 min
6. Parabolic Curvature Constant	Less than —0.04 ppm/°C (Refer Fig. 1)
7. Turnover Temperature	28.0°C +5°C
8. Capacitance Ratio	700 max
9. Storage Temperature Range	—30°C +80°C
10. Operating Temperature Range	—10°C +60°C
11. Aging rate	Less than +5 ppm/year
12. Shock	Less than 5 ppm for 50 cm Hammer Shock Test
13. Package Size	



DATA SHEET AVAILABLE. ALSO AVAILABLE CRYSTAL UNITS FOR QUARTZ CRYSTAL CLOCK.

AWARDS COLUMN

Bill Verrall VK5WV
7 Lilac Avenue, Flinders Park, SA 5025

DXCC Award

For those amateurs who chase DX or merely collect "countries" when they happen to hear a new one on the band the WIA Federal Awards Manager, Bill Verrall VK5WV, has written an informative article on the subject which will be serialised in AR.

The issues he raises are a matter of concern to the IARU, the larger amateur societies and down. There are other matters of concern which he does not raise and QSL Bureaux Managers would find no difficulty in listing undesirable spin-offs also.

In this changing world it is vital to preserve and enhance the good image of amateur radio, blending the new with the old, to ensure its well-being and viability for future generations. Many powerful users of the spectrum are only too eager to find "excuses" for amateur abuse of privileges and thus do not deserve spectrum space.

But there are many amateurs today who will say there is nothing wrong going on, nothing illegal is being done, nothing is harmful because "I get some benefit". Has anybody obtained the opinions of XZ5A by would-be amateurs in Rangoon? Who issued the licence for the 1S1 DX operation on Spratly? How about the "Principality of Hutt River"?

Because the Australian DXCC Award is small compared with "Big Brother" DXCC Award of the ARRL it has been convenient to follow their precedents. Is it not time to call a halt for a breath of fresh air and to re-assess our position? It is not beyond the bounds of amateur ingenuity to devise some other "country" criteria for DXCC purposes and deal with the QSL situation as a separate issue.

No two amateurs would agree with all of Bill's comments and conclusions. Indeed his ideas from the UN-DU Award would not necessarily resolve the South Shetland operations nor would they comply with the ITU "banned" countries lists.

All constructive comments should be mailed direct to the WIA, Box 150, Toorak, Vic. 3142. (Ed.) ■

Most readers would be familiar with the duties required of the WIA Federal Awards Manager. Briefly, this is to administer records and issue the six awards available from the WIA to any overseas or Australian amateur operators and SWLs as well as writing this column. However, you may not know that at least 60 per cent of my time is spent on administering one award, the DXCC. I would like to advise readers of the increasing difficulty I am experiencing with the DXCC.

The crux of the problem is trying to decide about validity or otherwise of some of the DX operations which have taken place over the past couple of years. Many recent DX operations and some current amateur radio activities have been or are shrouded in controversy over whether they are legitimate operations and therefore count for DXCC credit. This has been caused by a variety of reasons, but the principal contributing factor has been the attitude taken by those groups or individuals who administer the DXCC awards. I include myself in this category without reservation.

Traditionally, all previous FAMs and myself have followed the countries criteria and judgements announced by the ARRL. This body has the manpower, financial backing and support to engage, if necessary, in quite complicated, expensive and time consuming investigations through regular diplomatic channels to obtain information required to make accurate judgements about, e.g., the DXCC validity of certain amateur radio operations in other countries. In addition, the ARRL has a committee of interested DXers to provide advice as required. I do not know how this advisory committee is constituted but, for the purposes of this writing, it is not relevant.

The point is that the WIA does not have the manpower and resources to set up its own advisory committee to administer the WIA DXCC, nor do I think this is necessary. If we continue to regard amateur radio as a relaxation and pleasant way to make many good friends, we should not clutter up our hobby with various committees and groups of people to beat others over the head with dogmatic ideas about what (e.g.) constitutes a legal DX operation. If we face the facts, only a small proportion of our total membership is interested in clambering up the so-called DXCC Roll of Honour. However, this is the group I have to deal with and the job is becoming more difficult. In my view, we have some problems which will get worse, and I and subsequent FAMs will have to try and solve.

For the WIA DXCC we have a quite detailed set of rules which have been adequate to cover all DXCC requirements up to the present time. Two of the rules are:—

Rule 3.4: Credit may only be claimed for contacts with stations using regularly assigned Government call signs for the country concerned.

Rule 5.4: In all cases of dispute, the decision of the Federal Awards Manager and two officers of the Federal Executive of the WIA in the interpretation and application of these Rules shall be final and binding.

Herein lies the problem. The rules are quite specific but the questions to be answered are:—

1. Who decides whether a DX operation has been sanctioned by the "regularly assigned" Government?
2. Who identifies the "Government" of the country, i.e. the correct persons or sources to be asked about the operation?
3. Who has final say on the interpretation of the words "regularly assigned"?

The short answer is the FAM WIA!

Over the past couple of years certain decisions have been made about some DX operations where, in my opinion, it is evident that these have been made on other than solely apolitical considerations. This has left me, as FAM, somewhat confused and I now find that my personal opinion may be at odds with, e.g., some overseas operators or awards managers, sponsors of some DXpeditions or DX commentators in some of the amateur radio magazines and news sheets, etc.

For example, I don't think it is practical to ask some DX operators to produce written evidence that they have permission to operate before granting DXCC recognition. Some Third World countries that have had very little or nil amateur radio since gaining independence from their colonial fathers do not have the administrative machinery to approve in writing the activities of a visiting amateur operator. Such approval may be in the form of a verbal agreement with the appropriate official of the host country in his office or even over a friendly glass of wine at the local hotel. The point is that it is not always possible for some DXpeditioners/visitors to produce copies of amateur licences as we know them and as are required in Australia. Therefore, is this a reason for not giving DXCC recognition? There are other cases where the visiting amateur may travel in and out of the country several times or travel within the country and still not be required to possess an amateur operator's licence which is recognised by us. He may choose not to provide copies of any papers he may possess when asked by a DXCC awards manager. Is this sufficient reason to deny him DXCC recognition? Surely he would have his equipment confiscated or would be denied further access into the country if his amateur radio activities were not desired and/or approved by the host country.

There are further complications where visitors from certain countries are not welcome, whereas others would have free access and are permitted to operate within the host country with no restrictions. The position gets complicated again when we assume that because it is "so and so" from "such and such" a country operating, it must be OK, whereas if an unfamiliar call sign appears on the band, he may or may not be asked to produce papropriate paper-

work for DXCC authentication, in other words, there is a great deal of inconsistency about who we ask for copies of their amateur licences.

To sum up, I think the licensing requirements of some countries have changed to such a degree over the past few years that we will have to review and perhaps modify our interpretation of WIA DXCC Rule 3.4. It is possible that, with the insistence on what we say is acceptable amateur radio licensing requirements, some countries may even construe this as unacceptable interference in their own internal affairs. What right has any DXCC manager have of dictating amateur licensing requirements to another country?

I spend as much time either listening or operating on the DX bands as I can, I also have regular access to some of the DX bulletins, and have developed a network of some good friends and "spies" within the business, who often provide me with very useful snippets of information. I also have our written DXCC rules and it has often been necessary for me to refer some DXCC aspirants to these rules or quote a rule to get myself out of trouble. I always aim to comply with the rules to the letter.

I can always lean on Rule 5.4 when I feel I need other opinions but this is not practical because there are not two members of FE available for consultation in VK5. Furthermore, after I have completed my term of office, FE may appoint my successor from within a State other than VK3, so the position will be the same for the incoming FAM. With all due respect to the other members of FE, the advice that they would give would be greatly influenced by my recommendations because they may not be involved in DXing side of amateur radio through no fault of their own.

When one of these controversial DXCC recognition questions comes up, there are two ways I can go.

OPTION ONE

I can pin a copy of the WIA DXCC rules up on the wall, check the QSL card against the rules, and accept it or flatly reject it, and quote the rules to the sender if he or she complains. I can then hang my hat on any information or, in most cases, lack of information that I have about the operation, i.e. if there is any suggestion of doubt, reject the claim. From then on, I am unable to involve the WIA or myself in a lengthy and formal investigation of the claim because we do not have the resources or opportunity as previously mentioned. Up to this point in time, I have been guilty of this attitude, but this amounts to sticking one's head in the sand. I am sure that this is no longer acceptable to many DXers within VK, and no longer appropriate under the changed circumstances within the DX working environment which exists today.

Also this attitude is no longer acceptable to me because I now possess a couple of QSL cards which I would like to add to my own DXCC score, but cannot as yet within the traditionally accepted interpretation of the DXCC rules.

OPTION TWO

This is based on the premise that if the FAM is satisfied that the operation is valid and acceptable for DXCC recognition beyond a reasonable doubt, the claim should be recognised, *but* subject to the proviso that the FAM reserves the right to delete claims previously accepted if conclusive evidence is forthcoming from any legitimate source, that the operation was illegal and therefore not acceptable for DXCC credit. The FAM could then base his original decision on verbal evidence, or unofficial evidence in books, magazines, etc., hearsay, his own on air experience or in the final analysis, even a gut feeling! My proposal would be to announce such a decision about a specific operation in the Awards Column, provide a time limit for any constructive comments, and if nobody can come up with solid written evidence to the contrary, the DXCC claim would be recognised — but with the right of deletion still retained by the FAM as mentioned above.

Under Option Two, the FAM would not become involved in time consuming exercises in trying to obtain information which may or may not be available and we could have a system which is compatible with present-day circumstances and may be acceptable to a majority of VK DXers.

To illustrate the points I have discussed herein, here are a few comments about some of the difficult operations I have encountered since I have been FAM.

LU3ZY

This station has been operating on an intermittent basis from the South Sandwich Islands for at least three years. I initially rejected DXCC claims for this station and based my decision on what I regarded as reasonably reliable written information. When challenged, I embarked on a written exercise to three countries and ran up against a brick wall. This piece of real estate is still in dispute by certain countries and I obtained conflicting and inconclusive advice. I reversed my decision and accepted the QSL cards for DXCC credit, based upon a precedent which had been set by the ARRL.

VE1MTA

I accepted QSL cards for DXCC credit for this operation from Sable Island and after some weeks had to delete all credits because of advice that this was an unauthorised operation.

G3JKI/5A, 600DX, ANY 9U5

I am not aware of any restrictions on amateur radio activities within these countries which would preclude these operations from DXCC credit.

HH0N Navassa Island

This is a small rocky uninhabitable island with a lighthouse of approximately half a square mile in area situated at 19'N, 75'W, i.e. it is within 250 miles of the mainland of Haiti. If this island was administered by Hati, it would become a "deleted" country and count as Haiti for DXCC purposes. At the time of writing, the latest information was that this operation is not acceptable for DXCC credit because permission from the USA coastguard was not obtained. Be that as it may, I see no difference between the HHON operation and the 1S1DX operation from Spratly Islands which are claimed by about four different countries.

This is the exact opposite situation to the previously mentioned LU3ZY operation where this piece of real estate is in dispute and we will accept DXCC credit from two different countries for the South Sandwich Islands. Without getting involved in the politics of the HHON operation, how do I credit the QSL cards? Shall I credit them as Haiti, Navassa Island or throw them in the bin? When I receive my first HHON QSL and therefore have to make a decision, I will probably credit this one at Haiti.

1A0KM Sovereign Military Order of Malta

I worked this station in December 1980 and, at the time of writing, the status of this possible addition to the DXCC countries list was still under consideration. By coincidence, I saw a BBC produced documentary shown on the national television network a few months ago which traced the history of this Order which is represented in Australia by the St. John's Ambulance organization. There is no doubt in my mind that this "country" should be recognised under the same criteria as for the Vatican, San Marino and to a certain extent Mt. Athos. There is no point in including this "new " country in the WIA DXCC countries list at this time unless the ARRL do the same, because this would be the deciding factor on whether there would be any further amateur radio operations from this QTH. However, if SMOM is ultimately included in the ARRL countries list, I will accept QSL cards from the original operation for DXCC credit.

XZ5A/XZ9A Burma (Kawthoolei)

This is the operation which finally prompted me to try and do something about these hard ones.

There is no doubt that this station is operating from a QTH within the boundaries of the country of Burma as shown in my world atlas and a write up of the station was provided by Ken VK3AH in the September 1981 AR. However, current advice is that amateur radio activities are banned in Burma. If this is so, why has this station been operating almost continuously since May 1981?

Another question: Is the State of Kawthoolei being administered by a government in fact or a government in exile? This seems to be almost identical circumstances to that which resulted in the creation of the new DXCC "country" of Southern Sudan (ST0).

My personal opinion is that XZ5A/XZ9A should be accepted for DXCC credit for Burma without reservation. When wearing my FAM's hat, I will not accept this card for DXCC credit at this time but I definitely have not closed the book on this one.

In conclusion I can sum up by saying that for 99.99 per cent of the DX stations we work, we assume that they are legitimate operations and accept the QSL cards for DXCC credit without question. For the remaining 0.01 per cent, we work them but will not accept their QSL cards for DXCC credit unless and until they produce written evidence of authorisation as we require it! This is not relevant for current and future circumstances and if we continue to reject operations such as HHON and XZ5A for DXCC credit, our WIA DXCC award may lose credibility with many of our DX operators.

Needless to say, I am looking for your comments. What group are you in, the conservatives or progressives? Also, I recommend that you read this column next month when I will include some of my further comments about the DXCC.

On behalf of my XYL and willing helper, Joan, and myself, I wish all readers compliments of the season and good luck with your wallpaper hunting in 1982

STOP PRESS

The Sovereign State of the Knights of Malta, whose headquarters are in Rome, Italy, is now approved as an additional country to be added to the WIA, DXCC countries list — new total 319 countries. I will now accept 1A0KM QSL cards for DXCC credit for the previous operation in December 1980 and all subsequent operations from this QTH. The Knights of Malta QSL manager is I0MGM. ■

ALARA

AUSTRALIAN LADIES' AMATEUR RADIO ASSOCIATION

At the final meeting in Melbourne, held at Valda's QTH, nine ladies attended, including Geraldine VK2NQI from Sydney; lovely to meet our new President.

Retiring President Raedi YF VK3BHL welcomed all to the meeting and presented office-bearers with their badges. She wished them and ALARA a happy and successful year Mavis VK3BIR thanked Raedi for her work over the past 15 months. We hope to see you some Monday nights, Raedi.

A spray was presented to Raedi and also to Mavis VK3BIR for their efforts and appreciation was conveyed to both.

Rhonda VK3ZYL is our historian and it will be good in future to read of the early days of LARA (as it was then).

It was good to see some of our members in the VK6 YL luncheon group photo; always nice to put a face to a call sign.

Congratulations to Mavis VK3KS for the gold cup in SW section of DX YL to North America contest. This is cup number 6 in YLRL contests.

Freda VK2SU has been issued with the first ALARA Award all CW by a YL. Good work, Freda, and congratgulations to OM on new call in the family.

Girls, if you would like to join ALARA please write to Valda Trenberth VK3DVT, C/- Brighton PO, Church Street, Brighton 3186, Victoria. A copy of our new information sheet will be sent to you, this has all details of fees, skeds and is interesting for new girls to read.

New office-bearers: President Gerladine VK2NQI, Vice-President Joyce VK2DIX, Secretary Jessie VK3VAN, Treasurer Valda VK3DVT, Editor Marlene VK5QO, Historian Rhonda VK3ZYL, Librarian Jean Truebridge, Publicity/Contest Manager Margaret VK3DML, State Co-ordinators Geraldine VK2NQ, Mavis VK3KS, Sandra VK4NUE, Jenny VK5ANW, Gill VK6YL, Helene VK7HD.

Thank you to all of you for your support of ALARA and hope it is an enjoyable association with you all.

Thank you to all who participated in our first contest and look forward to meeting again next year.

This is my last report for this year and I have enjoyed talking to you all in this column, so will take this opportunity to wish each and every one of our readers a very happy Christmas and a safe and prosperous New Year. I hope you will all be with us again next year, until then take care.

33/73/88 to all.

Margaret VK3DML ■

HF, UHF and VHF ANTENNAS BY ATN

	Gain dbi	Boom	Price incl. balun
15/11/10 mx			
ATN 20-30-1 rotary dipole			$40
10/11 mx model			
ATN 28-29-3B or 27-28-3B	9.5	3.5M	$70
ATN 28-30-3	9.7	3.5M	$89
ATN 28-30-5	12.0	6.5M	$149
ATN 28-30-6	13.2	8.3M	$199
6 mx			
ATN 50-502.5-5	11.9	3.5M	$95
ATN 50-53-8	14.2	5.5M	$149
ATN 50-53-11	16.2	9.0M	$185
2 mx			
ATN 144-148-8	12.7	2.2M	$55
ATN 144-148-11	14.6	3.8M	$65
ATN 144-148-16	17.0	6.3M	$85
ATN 144-148-13WS	17.3	7.0M	$85
70 cm Model (N Conns)			
ATN 420-470-6	10.2	0.6M	$45
ATN 420-470-14	14.2	1.5M	$59
ATN 420-440-11	15.7	1.85M	$65
ATN 420-440-15	16.7	2.85M	$75
ATN 432-16LB	17.2	3.7M	$85
UHF CB (N Conns)			
ATN 47-5	9.2	0.65M	$45
ATN 47-7	10.2	0.7M	$49
ATN 47-11	17.0	1.7M	$59
ATN 47-15	17.8	2.8M	$69
Amateur TV Translator			
ATN 580-14 (N Conns)	17.5	2.0M	$65

ALL LISTED HF ANTENNAS use top grade 6063-T83 seamless tapered and swaged tubing elements with non-brittle ABS tough weather resistant insulators. Booms are 2" OD (longer booms use guys supplied) and elements taper from ⅞" OD or ⅝" OD depending on length. Longer elements use positive rake on insulators to reduce unsightly sag. The best possible materials have been chosen to suit tough Australian weather conditions.

TRAPLESS TRIBANDERS, 13-30 MHz, Continuous Coverage (Includes new WARC & CB) (LOG PERIODICS)

Model	Elements	Boom (metres)	Gain dbi	Price with 2kW PEP Balun
13-30-6	6	6.0	7.5	$289
13-30-8	8	8.5	9.0	$399

TRAPLESS DUOBANDERS, 20-30 MHz, Continuous (Includes new WARC & CB) (LOG PERIODICS)

20-30-6S	6	4	7.5	$189
20-30-6L	6	6	8.5	$219
20-30-8	8	8.5	10.2	$299

MONOBANDERS — For 14 and 21 MHz

14-14.4-4	4	7	10	$269
21-21.5-4	4	6	9.9	$199
21-21.5-5	5	8	11.2	$289

Also available power dividers/couplers, quarter wave sleeve baluns and matching harnesses for stacks of two or more arrays; also 1:1 and 1:4 baluns in 200W or 1 kW and insulators for homebrew. Write for free catalogue.

ATN ANTENNAS

56 CAMPBELL STREET, BIRCHIP, VIC., 3483

PHONE (FACTORY) (054) 92 2224 (OFFICE) (054) 92 2264

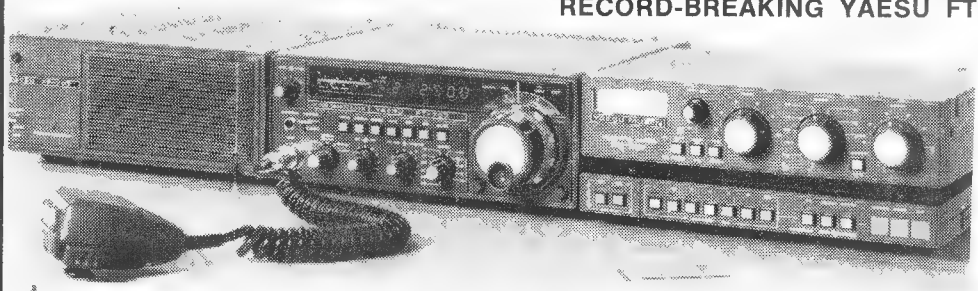
ALSO AVAILABLE FROM: **VIC. (03) 873 3939** **VIC. (03) 789 3412** **TAS. (002) 47 6674** **TAS. (003) 31 7075** **W.A. (09) 328 9229** **S.A. (08) 47 3688** **QLD. (07) 397 0808** **N.S.W.**

Andrews Communications Systems

UPGRADE TO YAESU NOW!

NO RIP-OFFS HERE

RECORD-BREAKING YAESU FT-707 SERIES



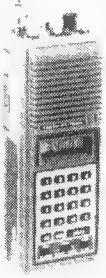
YAESU

★ FT-707 Why pay **$750?**
★ FP-707 Less than **$170!**
★ FC-707 Why pay **$146?**

Call us and save heaps!

WHY PAY MORE ELSEWHERE?

ALL NEW!



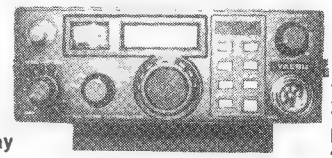
FT-208 R

$329 Why pay more?

Best 2m FM hand-held ever! LCD, 10 mem. chs., 300 mW-2.5W o/p, scan limits, lithium mem. battery.

YAESU FT-290R

All-mode 2m portable



ONLY **$349**

PLL with LCD display & 10 mem. channels. SSB/FM/CW 2.5W. Supplied with scanning mic.

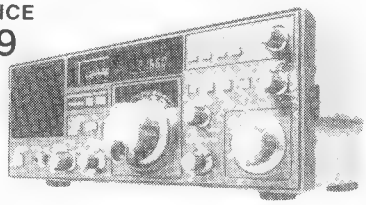
NEW YAESU FRG-7700 "SW"

HIGH PERFORMANCE ALL MODE "SW" COMMUNICATIONS RECEIVER

OUR PRICE **$449**

SAVE **$50**

Now 240V AC and 12V DC



Features . . .

★ 2 29.99 MHz
★ AM-FM-SSB
★ 3 AM band widths
★ Optional:— 12 ch. memory; VHF converter. Antenna tuner

DIGITAL FREQUENCY AND TIME DISPLAY

FREE champagne till Christmas to purchasers of over $100 gear.

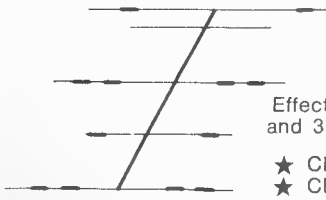
★ FT-101Z HF SSB Tcvr., new Mk. 3 model, fan, mic., **$800** (FM)
★ FT-107M/DMS, inc. AC, WARC bands of YM 35, only **$1,228**

MIRAGE 2m Linears

★ B23 — 2W IN, 30W OUT **$119**
★ B108 — 10W-80W **$225**
★ B3016 — 30W-160W **$289**
★ B1016 — 10W IN, 160W OUT **$339**

SOLID-STATE HF LINEAR AMPLIFIERS

★ TP-500, 500W PEP RF o/p, uses 4 x DX541CFs driven by MRF454, only 10-20W dr. needed, 3 levels o/p, 40A av., **$450**
★ TP-350, 350W+ o/p, **$325**
★ TP-200, 200W+ o/p, **$215**
★ TX-200, **$219**

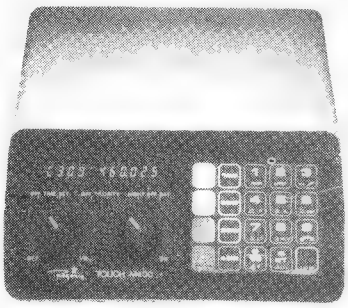


CE-35LX TRIBANDER

$329 Full size 10m reflector!

Effectively 4 el on 10m, 4 el on 15m and 3 el on 20m on 22 ft. 6 in. boom

★ CE-35DX TRIBANDER, only **$299**
★ CE-33, CE-42, CE-5B in stock.



REGENCY

"TOUCH" M400E

DIRECT IMPORTER

$429 FREE P & P

★ 30 Ch. VHF/UHF scanning receiver!
★ EXCLUSIVE 5 kHz Channelling on VHF Bands!
★ VARIABLE Search Increments!
★ Covers 66-90 MHz, 144-174 MHz and 440-512 MHz.
★ Touch tone programming, AC/DC, Digital Clock, etc.
★ M100E 10 Ch. VHF/UHF Scanning Receiver **$379**

MORE CHEAP KENWOOD . . .

★ TS-830S HF SSB Transceiver, **$985**
★ TS-530S, very cheap base **$749**
★ TS-130S, **$650** to clear.
★ TR-7850 **$469**
★ TR-7730 **$349**
★ DM-81 only **$99**

CALL (02) 349 5792 or 344 7880 NOW!

SHOP 7, GARDEN ST, MAROUBRA JUNCTION, SYDNEY N.S.W.

(near corner of Garden St. and Maroubra Rd)

THE MAIL ORDER SPECIALISTS Write to: P.O. BOX 33, KENSINGTON N.S.W. 2033

TRY THIS

WITH THE
TECHNICAL EDITORS

NOVEL PHASE LOCK CIRCUIT

In "Electron" for May 1981 Klass Spaargaren PA0KSB described a receiving converter using a novel local oscillator locking technique which is a form of Phase Locked Loop. The receiving converter for a 2 metre multimode transceiver provided reception of signals from frequencies of a few kHz to 30 MHz.

The converter uses an oscillator locking technique which is economical of components and allows an oscillator in the frequency range of 116 MHz to 144 MHz to be locked to a 1 MHz reference oscillator signal.

The oscillator and locking circuitry is shown in Fig. 1 and the reference crystal oscillator in Fig. 3.

The following is a description of operation of the circuit.

THE OSCILLATOR

The oscillator can be tuned from 116 to 144 MHz by means of the panel mounted potentiometer which controls the DC voltage applied to the varicaps. The oscillator frequency is adjusted until the system locks. Usually the two frequencies being compared are fairly close together and locking is easily achieved. However, as we are looking at a large frequency difference between frequencies of 1 and 130 MHz so a different technique is used.

The principle used here is called the "sample and hold" detection method. This method enables phase lock to be obtained between two frequencies that are far apart and it is still effective.

This sample and hold system is not new but may not be well known to radio amateurs. So here is a description of how it works. See Figs. 1 and 2.

The Sample and Hold circuitry consists of T5 and the 150 pF capacitor. The BF900 with both gates strapped together functions as an electronic switch. The gates are controlled by short pulses at the 1 MHz frequency so that the switch will conduct for a short time every one millionth of a second. The input of the electronic switch sees the frequency that needs to be phase locked. If the switch conducts or samples on the same point of the HF sine wave every time then the 150 pF capacitor will be charged to the value Vu. See Fig. 2A. While the switch is closed and thus not sampling the capacitor will hold or remember the sampled voltage. The equivalent circuit is shown in Fig. 2B. Obviously the load on this 150 pF capacitor has to be extremely light for the voltage to remain the same. So a CA3140 FET input op amp was chosen.

An interesting point of this principle is that the DC voltage at its output remains the same regardless of whether the sample is taken each 130 or 131 cycles. See Fig. 2A.

Thus this phase detector is independent of the input frequency. Although this is not completely true in practice as will be explained later on.

The CA1340 FET input operational amplifier increases the sample capacitor voltage by about 10, and this output goes back to the varicap in the voltage controlled oscillator and so completes the phase lock loop.

In the loop as described here, consisting of the voltage controlled oscillator, phase detector and operational amplifier, the oscillator will lock at any 1 MHz harmonic.

Suppose the VCO starts to change frequency. Then the sampling would now take place on a different part of the wave form resulting in a change in the DC output voltage which in turn would counteract the original change in frequency with the overall result being that the 130 MHz frequency remains in phase lock with the crystal derived 1 MHz signal.

For stable action of the loop, which could be described as an amplifier with heavy feedback, a stabilising network of a 10K resistor and a 10,000 pF capacitor is placed in the feedback path of the CA3140. The situation described so far applies for a locked or near locked condition. But now for the bitter part where we are completely out of lock. When the 130 MHz is not in lock with the 1 MHz, then sampling will take place on a different spot all the time and the 150 pF capacitor will receive a voltage that starts to look like an AC voltage depending on the frequency difference of the 1 MHz and the 130 MHz signals. If the frequency to be locked is near to an exact multiple of the reference signal the loop will still be able to get to a phase locked condition. However when the initial frequency difference is large there will be a situation where the amplifier output just can't follow the instantaneous phase difference and no phase lock will occur

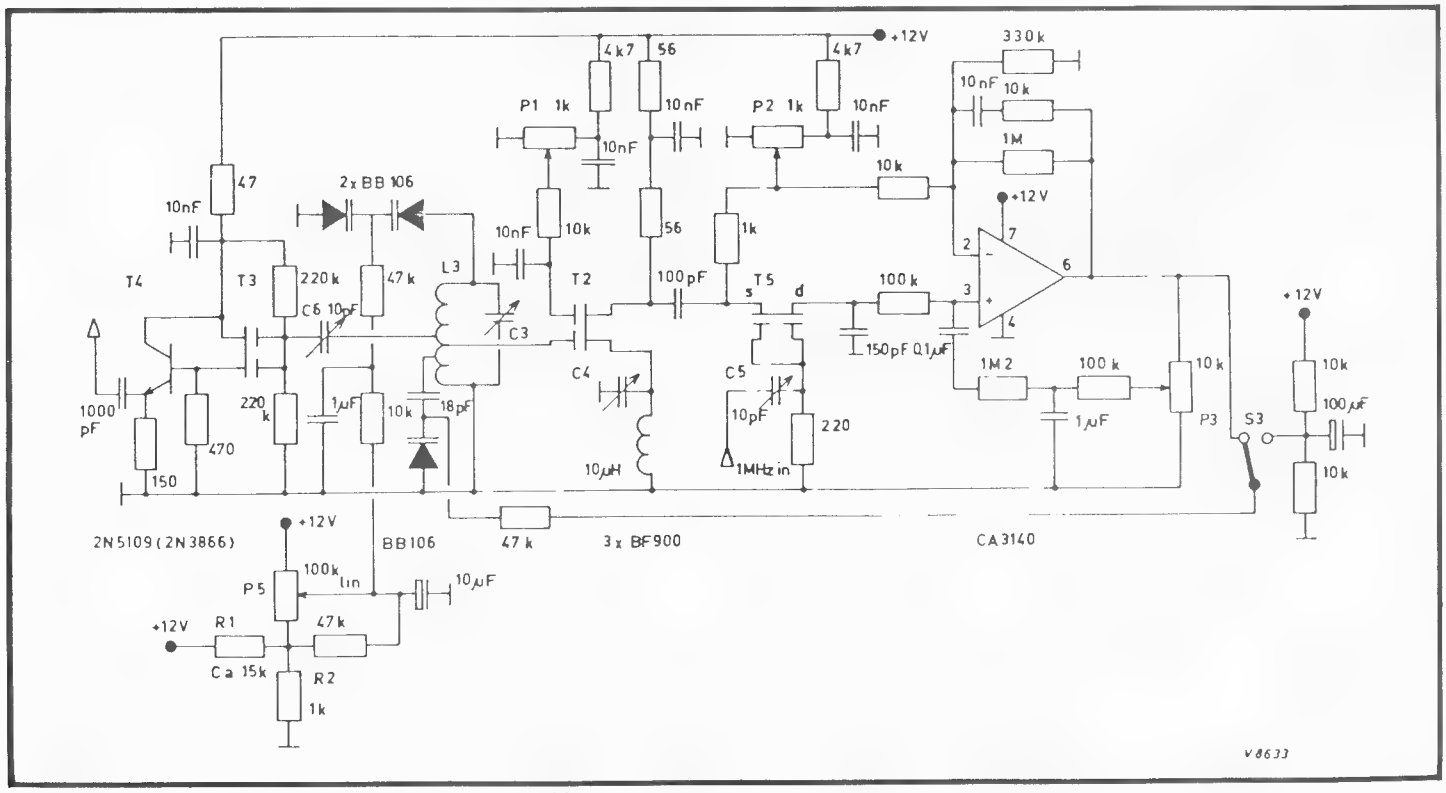


FIG. 1: Oscillator and PLL Circuit.

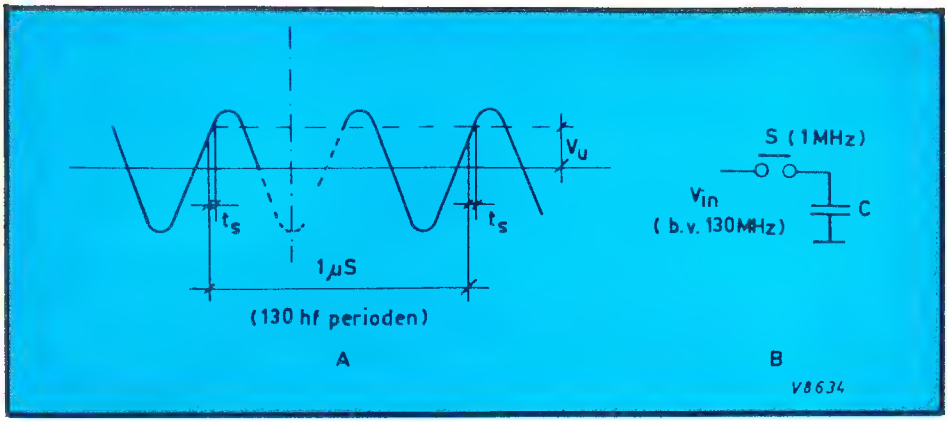


FIG. 2: Sampling.

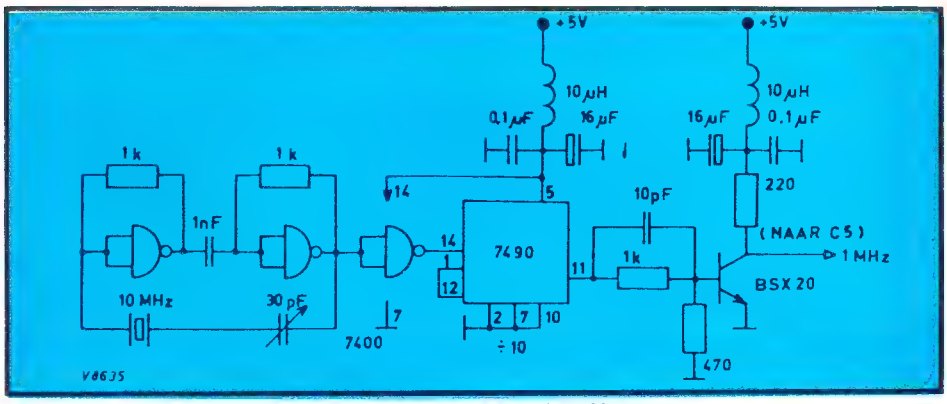


FIG. 3: Oscillator and Pulse Shaper.

But this no lock condition is overcome by a special positive feedback circuit from the output of the op amp to its non-inverting input. This *search* circuitry will force the DC output to oscillate slowly up and down. At the instant that it passes the value which corresponds to a harmonic of the 1 MHz phase lock will be achieved.

At that point we can visualise that the loop has extra negative feedback which is very strong and stops the slow DC oscillation.

Thus with this search system we only have to adjust the C2 capacitor until we are roughly near a 1 MHz harmonic and the PLL circuit will then lock in at the precise phase relation.

1 MHz PULSE GENERATOR

A 10 MHz crystal is used which is divided by 10 through a 7490. Possibly a 1 MHz could be used without the need for the 7490 but I had a 10 MHz crystal on hand. With the trimmer the crystal can be calibrated to exactly 10 MHz. The 10 pF capacitor together with the BSX20 differentiates the square wave from the 7490 improving the risetime. The differentiated square wave is used to steer the gates of the BF900 FET T5.

Thank you to Bill VK3BHW for bringing the original article to the attention of the Technical Editors and for providing a translation of the major part of the original article.

VK3AUI. ■

Operation Barrington Tops

A search mission to locate missing Cessna aircraft VH-MDX, missing since the 9th of August 1981 with five men on board.

Following an unsuccessful seven day search for the light plane in which aircraft crews and ground searchers were exposed to "unacceptable risks" due to prevailing weather conditions NSW Police decided to mount an intensive ground search on the weekend of the 19th and 20th September.

Specialised volunteer groups were contacted to search the most probable crash area, the most heavily forested, rugged, inaccessible part of NSW.

Although the search failed to find the aircraft it proved that specialised volunteer groups can work together and with the statutory authorities in a major operation. 542 men and women from the Police, State Emergency Services, Army Reserve, Forestry Commission, Hunter District Water Board, National Parks and Wildlife Service, Hunter Valley 4X4 Club and many Volunteer Rescue Association squads were involved.

The Wireless Institute Civil Emergency network was activated by the NSW Police. Amateurs came from Hunter Region, Central Coast Region and Taree WICEN to provide radio links between the Police Control Centre at Dungog and various groups of searchers. Amateurs manned field stations deep in the Barrington Tops for up to 52 hours, literally bedding down next to their radios. Operators had to provide and establish portable stations on 146.0 MHz, 146.9 MHz (repeater ½900), 7.05 MHz, 3.6 MHz and 439.0 MHz. Radios on the VRA rescue frequencies were provided by the squads involved. WICEN also provided a TV crew to film SES and WICEN personnel in the operation for training purposes.

After seeing the rugged area they were required to search, the Police Air Wing Chief Pilot requested a portable on the WICEN frequency in case they had to make a forced landing. This was provided but fortunately was not needed.

When one seemingly undeliverable message was offered to the other services involved a comment was heard "Give it to WICEN, they can do anything"; the message was delivered.

Amateurs operating in the search area were VK2s BVO, YUP/PEP, KAL, BJC, KBN, DCW, NZW, AVO, DVL, GL, BSC, ZED/PED, BUL, ZRT, BVT, BVI, BVQ, YCB, BMK, YFJ/NLO, VWD, BRF, ZVF, NUM, AOH, ZMK, BMM, KCS and DKP.

VK2BOT and VK2BGF operated in Taree, VK2TS and VK2BUQ manned stations in Gosford and VK2NL, DHG, NFF, NWA, AGS, DI and DEX operated in Sydney.

A special thanks must go to Ray Wells VK2BVO, Central Coast Region WICEN Co-ordinator, Max Francis VK2BVO, North Coast Region WICEN Co-ordinator, and Charles Withers VK2BVI, Taree local WICEN Co-ordinator for their support in this large operation.

Kim Piper VK2DKP,
Hunter Region WICEN Co-ordinator. ■

Roma Piper VK2NZW hands a 2 metre transceiver to Police Chief Pilot Peter Leslie, who requested it for emergency communications in case of a forced landing. Photo: Mike Richter VK2BMM

National EMC Advisory Service

Tony Tregale VK3QQ
Federal EMC Co-ordinator

"BE PREPARED"

This may be a good time of the year to give the shack a "bit of a check-over" — perhaps review that "bird's nest" of cables behind the equipment racks, shorten the excessively long cables, check equipment earth bonding and check antennas for loose corroded connections . . . A complaint of RFI can arrive at any time — the new neighbour with his unfiltered equipment, the Christmas present with "rabbit ears", or the robot with the disc memory.

As most of us know only too well, the majority of RFI complaints are not caused by problems in the transmitting equipment but by deficiencies in the receiving equipment. However it is most important to keep a close "eye" on those unwanted harmonics, which not only help to cause RFI but can also become a drain on your hard earned power. Transmitter alignment should be carried out with the aid of a spectrum analyser in order to ensure that all harmonic levels are as low as possible (or to manufacturers' specifications) before the signal is fed to the low pass filter arrangement.

Use of a low-pass filter alone does not make any provision for *dissipation* of the unwanted harmonic energy produced by the transmitter. Since there is a high degree of impedance mismatch between the coax cable and the input of the low-pass filter at frequencies above the cut-off frequency, there is a high VSWR on the feed cable between the transmitter and the filter at harmonic frequencies. Also, since there is usually no provision for external dissipation of this energy and since harmonic energy is continually being produced, dissipation occurs only in the final amplifier stage and in the cable. Consequently there is a likelihood of harmonic energy radiation from the transmitter itself, as well as possible harmonic energy radiation from the cable because of leakage, faulty connectors and so forth.

An obvious solution is to use a high-pass filter having a 50 ohm resistive load connected in shunt with the feed cable, e.g. by means of a coaxial T connector. Such a high-pass filter should be designed to have the same cut-off frequency as the low-pass filter, to have a 50 ohm input and output impedance, and to have series M-derived end sections so that its input impedance at frequencies below cut-off will be high.

The result will be that harmonic energy is dissipated in the 50 ohm load connected to the output terminals of the high-pass filter. The shunt effect of the high-pass filter will be negligible at low frequencies because of the high input impedance of this filter below cut-off. There will be no high currents and voltages at harmonic frequencies since the SWR at the harmonic frequencies will be close to unity. Harmonic energy will be dissipated outside of the transmitter chassis, and not all in the final amplifier, so the final stage will run a bit cooler. Of course, all this leads to less TVI. This concept of complementary filters has been used for many years in hi-fi installations for separation of high and low frequencies.

Station earthing is another area which tends to get overlooked. A good station earth system can play a large part in alleviating RFI problems.

The *true electric ground* is a common reference point in a circuit which is at the same potential as the earth. Earth is literally taken as ground, but not all earth provides a good ground as the electrical conductivity of the earth varies widely, depending upon the soil and its moisture content. The best true grounds are the salt water ocean, where conductivity is higher than that of earth, and a salt marsh. The next best ground is the earth itself, especially mineral-bearing soil. The poorest ground is dry, sandy or rocky soil of low mineral content. Many areas of the world have this poor soil and it is thus necessary to simulate a good earth ground.

The efficiency of an earth grond depends upon the resistance, or impedance, of the ground path. If the ground circuit resistance is high, considerable noise voltage may be built up between the earth ground and the point of the equipment that is supposed to be at ground potential.

Ground resistance is made up of the resistance of the ground lead and the ground rod(s) driven into the soil, plus the resistance of the earth-to-rod contact and the resistance of the earth surrounding the rod. The resistance of the lead, the rod and the rod-to-eatrh contact are usually insignficant when compared to the resistance of the earth around the rod.

Bureau of Standards tests have shown that if the ground rod is free of paint or grease and the earth is packed tightly around it, the contact resistance is negligible. The resistance of the earth around the rod, however, is not negligible. Earth resistance in the vicinity of the rod can be considerable, but the majority of effective resistance is generally within a radius of six to ten feet of the rod. Beyond that, the area of earth involved in the ground return path is so large that the resistance is unimportant.

Soil composition tests run within an area corresponding to the near-region of a ground rod indicate ground resistance may run from an average figure of about 14 ohms for low resistance, highly conductive soil to as high as 500 ohms for rocky, gravelly soil. It was also determined that the water content of the soil affected ground resistance. For example, a given sample of soil having a moisture content of 10 per cent exhibited a resistance of 350,000 ohms per cubic centimetre (350 k-ohms/ccm). Increasing the moisture content to twenty per cent brought the resistance down to 10 k-ohms/ccm. A moisture increase to thirty-five per cent reduced the resistance to about 5 k-ohms/ccm.

Moisture content of average soil varies from about 10 per cent in dry seasons to around 35 per cent in wet seasons. This is why the measured resistance of a ground rod will often double from a wet spring to a dry fall.

Mention was made in September AR regarding the production of an "Australian RFI Directory of Assistance". I am pleased to report that positive progress is being made; a full list will be published in the new year. The pre-publish file includes the following equipment manufacturers: AWA, General Electric, Healing, HMV, Luxor, Mitsubishi, Philips, Rank Arena, Rank Electronics, Rank Nec, Sharp, Sony, Thorn.

In closing for this year I would like to thank all those who have assisted with the EMC service over the past twelve months. I look forward to receiving your most valued assistance next year. ■

INTRUDER WATCH

The Australian Intruder Watch is receiving an overhaul. IW in this country will progress from a supportive role to the point where it is a significant and fully effective organisation. Support from Executive, Divisions, Co-ordinators and individuals is essential if this is to happen.

Published procedures and adequate educational material are high on the list of priorities. It is hoped that this will allow effective participation by all who become involved. In the meantime, amateurs and SWLs who are bothered by intruder operation on our exclusive bands should indicate their interest by sending a written complaint to their Division IW Co-ordinator.

There is great reluctance to send intruder reports, and this is understandable. Not all of us have the skill and experience to convert QRM to an accurate and meaningful report. Do not let this stop you. You have a right and a duty to complain when great chunks of bands are stolen. Practice in reporting will soon bring your contribution to a high standard. There is certainly no shortage of practice material, so go to it!

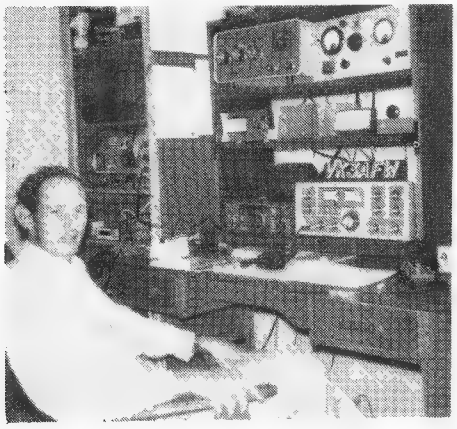
Our "Intruder of the Month" award is shared by two stations. They are:—

"UMS", reputed to be Russian Merchant Navy shore to ship. Uses A1 CW, F1 RTTY and F4 FAX, on 14141, 14171, and especially on 21032 kHz. Operation is intermittent, all daylight hours.

"CQ5", A1 CW on 21115 kHz at 0400, 0600, 0800 and 1000 GMT, Monday to Saturday.

Bob McKernan VK4LG,
Federal IW Co-ordinator. ■

NOVICE NOTES



Edited by Ron Cook VK3AFW

QUESTIONS AND ANSWERS

Some time ago one of the readers of this column wrote in suggesting that we include a questions and answers section. Fine, we said, please send in some sample questions. As nothing has been forthcoming, I have selected some based on the sample test questions for Section M (Theory) of the AOCP examination as published in the current issue of the Amateur Operators' Handbook.

Q.1: What is the front-to-back ratio of a beam antenna?

A.1: The front-to-back ratio of a beam antenna denotes the ability of the antenna to reject signals arriving from the rear. Like all ratios it can be (and frequently is) expressed in dB. (Q.1½: What is a dB?) dB is an abbreviation for deci-Bel or one-tenth of a Bel. The Bel is an inconvenient size for practical use so the dB is used in engineering and scientific applications. If we have two different powers P1 and P2 then their ratio in dB is given by:—

Ratio = 10 log (P1/P2) dB.

See Table 1.

TABLE 1. Ratios expressed in dB.

Ratio	dB
1	0.00
2	3.01
4	6.02
5	6.99
10	10.00
20	13.01
40	16.02
50	16.99
100	20.00
400	26.02
1000	30.00

Nof if we went to express power ratio but can only measure voltage — a common occurrence — providing the circuit resistance remains the same we can use a similar formula.

Now Power = (Voltage)^2/Resistance and if V1 gives P1 and V2 gives P2, we get

Ratio = 20 log (V1/V2) dB.

This takes into account the squaring of the voltage. So a 10 times voltage ratio is a 10 × 10 = 100 times power ratio, or 20 dB.

Back to the antenna. A beam antenna has at least two elements arranged so that signals arriving from the forward direction are gathered in and added together to provide a greater signal. Signals arriving from other directions are added so as to produce cancelling effects and so are made weaker. A typical beam provides a front-to-back ratio of 10 to 20 dB with up to 40 dB rejection of signals off the sides.

Q.2: What are keying chirps and what causes them?

A.2: When a CW transmitter is keyed we expect to receive a CW signal of constant pitch. If the pitch changes during keying it sounds rather like a cricket chirping, hence the name chirp. Chirp is a shift in frequency of the CW signal when keying takes place, and is not to be confused with thermal drift. As a transmitter warms up or when the room temperature changes a relatively slow change of frequency may take place. Th's is thermal drift. Chirp is an unwanted shift in frequency that takes place in a fraction of a second. It is objectionable because it causes the transmitter to use more bandwidth than necessary and makes copy more difficult.

It could be caused by lack of regulation of the oscillator DC supply. When the key is depressed the transmitter supply will drop a little and if the oscillator supply is inadequately regulated then the oscillator will shift frequency.

If the transmitter is not well designed the keying may operate on a stage close to the oscillator and cause the load seen by the oscillator to vary between key down and key up. This will also cause the oscillator to shift frequency on key down and return on key up.

Inadequate filtering of the keying circuit may cause key clicks but not chirp.

Q.3: How many pF in a microfarad?

A.3: Capacitance is measured in Farads. This is another unit which is inconveniently large so sub-multiples are used. Table 2 shows the sub-multiples.

TABLE 2. Prefixes and sub-multiples.

Prefix	Sub-multiple	Symbol
milli	1/1,000	m
micro	1/1,000,000	u
nano	1/1,000,000,000	n
pico	1/1,000,000,000,000	p

Most amateurs still use only picofarads and microfarads. From the table we see that 1,000 pF must be the same as 0.001 microfarad. Strictly speaking, we should not use either description as it is 1 nanofarad.

So 1 uF = 1,000 pF
= 0.001 uF
= 0.000 001 mF
and 1 uF = 1,000,000 pF
and 1 mF = 1,000 uF.

We really should use whatever unit provides us with a value between 1 and 999.999. For example, a 4,700 uF capacitor is a 4.7 mF capacitor, 0.047 uF is 47 nF and 1,500 pF is 1.5 nF. Amateurs are so used to uF and pF that they may be one of the last to abandon the old habits and accept fully the correct International System (IS) terminology. Fortunately we have at least dropped uuF in favour of pF.

Q.4: A series capacitor and inductor have zero series impedance at resonance. What is their impedance at other frequencies?

A.4: Pure reactances have no losses or series resistance, they have only reactance.

Impedance is a term that applies to any reactive circuit and is usually expected to include a resistive component.

The reactance of an inductor is given by

$$XL = 2\pi fL$$

when f is in Hertz
and L is in Henry
then XL is in Ohms.

The reactance of a capacitor is given by

$$XC = 1/(2\pi fC)$$

when f is in Hert
and C is in Farads
then XL is in Ohms.

For a series circuit the reactances are additive. Now the current through both elements is common and the voltages across each have a unique relationship — they have opposite polarity. As the supply voltage V = IZ = IX = VL — VC, where Z = impedance, X = reactance, VL = voltage cross L, and VC = voltage across C, the reactances must have signs attached.

Actually X = XL — XC
= $2\pi fL - 1/(2\pi fC)$.

At very low frequencies $2\pi fL$ is small and $1/(2\pi fC)$ is large, so X is capacitive. At very high frequencies $2\pi fL$ is very large and $1/(2\pi fC)$ is shrinking away to a small value. So X is inductive. At some intermediate frequency XL = XC and X = 0. This is of course the resonant frequency.

f res = $1/(2\pi\sqrt{LC})$ and all frequencies described before as high or low are high or low relative to f res. At frequencies greatly removed from f res the circuit acts as if only L or C were present but near resonance different effects occur. As the frequency rises towards resonance the reactance falls rapidly so that while X is still capacitive, C seems to be increasing. Below but near resonance the circuit looks like a much larger capacitor than C. Above resonance the reactance is inductive but it seems as though L has been reduced. And of course at resonance both L and C have vanished. This odd behaviour is apparent if the formulae are studied.

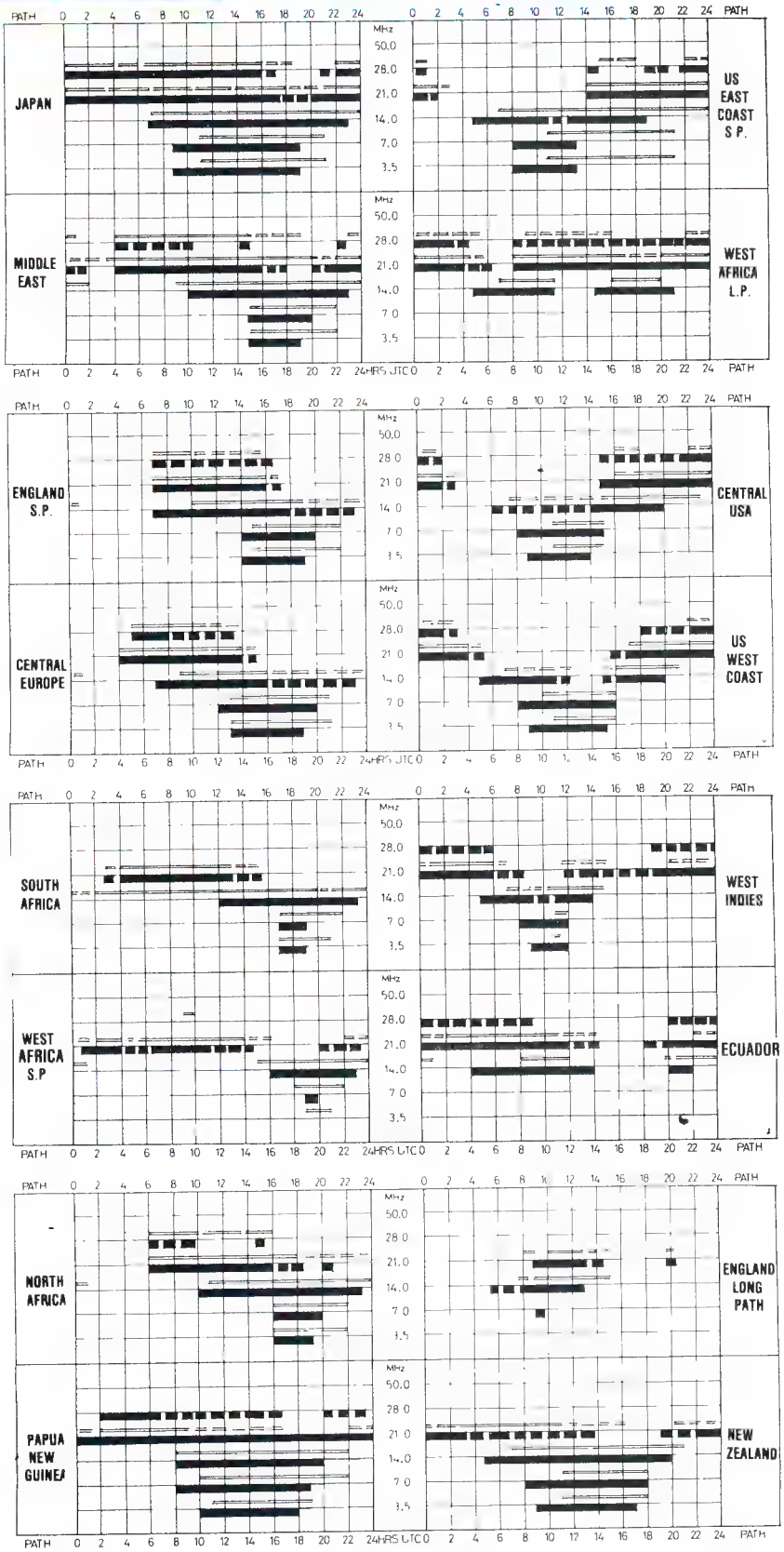
Well if you liked this approach let me know and it will be repeated (with different questions of course). If you have any questions of your own why not write in — I'll try to answer them.

73. Ron. ■

The WIA is in busines for more members. Please help.

IONOSPHERIC PREDICTIONS

Len Poynter VK3BYE



Predictions courtesy Department of Science and Environment IPS Sydney.
All times universal UTC (GMT).

IF YOU'RE NOT BUYING AMATEUR RADIO ACTION

(IT'S AUSTRALIA'S BEST SELLING AMATEUR MAGAZINE)

THEN YOU'RE NOT KEEPING UP WITH THE LATEST NEWS, VIEWS AND REVIEWS

Please put me down for 12 editions of Amateur Radio Action, starting NOW!

RATES: Within Australia: $15.60. Surface Mail overseas: $21.00. Air Mail to New Zealand: $31.80. Papua New Guinea: $29.40. Air Mail to USA: $43.80. Europe: $47.40.

Herewith enclosed cheque/postal note/money order to the value of:

$A.....

Name.....

Address.....

.....

.....

Postcode.....

Post to: Amateur Radio Action Subscriptions, Box 628E, Melbourne 3001.

Changed your address or callsign?

Let us know and we will bring our records up to date.

The Active Short Monopole Receptor

Ross F. Treharne VK5IQ

An active antenna was described by Barnes (1981) and Cook (1978, 1979), and some are available commercially. These receptors do work remarkably well but it should appreciated just how they do work.

In most circumstances it is not the little piece of wire called the antenna which actually picks up the signal. More commonly it is the outside of the feeder, or the "counterpoise", or the roof gutter, or receiver chassis, or mains lead, or what not, which actually collects the energy from the electromagnetic wave and injects the signal into the pre-amplifier. The so-called antenna just acts as a return path for this signal. The role of "antenna" and "earth" are in fact reversed. Therefore in looking to the radio pick-up characteristics of these little wonders it is important to understand that the effective connection with the electromagnetic waves is governed by the mounting arrangements as much as anything else.

This interchange of roles is not new, Treharne (1980). The first example was probably the "Little Wonder Aerial Eleminator" advertised in the mid-thirties when radio sets had aerial and earth terminals. The "Little Wonder" consisted of a sealed box with two terminals. One was connected to a water-pipe earth and the other was connected to the aerial terminal of the radio set. The earth terminal of the radio set was, of course, connected to the chassis of the set. The chassis was not earthed, except via the supply power lead or mains earth wire, if any.

This arrangement gave excellent reception, the power mains or mains earth wiring acting as the antenna. The antenna terminal was, of course, earthed. Sometimes, as a safety measure, the "Little Wonder" contained a capacitor between its terminals but it worked just as well with a piece of copper wire. It was not uncommon to eliminate the eliminator and just use copper wire but this was unsafe if the mains transformer developed a fault and the earth wires fell off the water pipe at the same time.

The modern-day active antenna behaves in a similar manner except that for shortwaves the feeder rather than the mains (hopefully) does the collection of the radio energy. The very high impedance input of the pre-amplifier permits the signal to be better matched into the very high impedance return element.

Of course some signal is picked up on the short, so-called antenna, but it is microscopic (e.g. 20 dB down) compared with that from the feeder, etc. A demonstration of this can be made by using a dipole instead of a monopole. If care is taken to balance both sides of the dipole the feeder-induced signals will disappear leaving a small signal which is truly collected on the antenna; see Treharne and Johnson (1971).

In this application to direction finding it was important that the phase centre of the receptor be accurately known, hence the need to balance out the feeder pick-up. For normal shortwave reception this does not apply and some extra pick-up from the feeder is in order — unless this also brings in noise from domestic appliances as well of course. If you inadvertently put one of these active monopoles on an extra good ground plane do not be surprised if the signals become weak

A further extension of ths line of reasoning may be made to medium wave antennas or motor cars. Clearly the car body itself collects more energy at 1 MHz than the 30 cm whip. The whip is just an earth return. Even at 11 (or 10) metres the very short centre loaded whips are not really antennas, just return elements. Again the short helical whips for 80 and 40 metres probably do not radiate as much energy as the car body but do provide a match. However, tall whips on 10 metres and quarter or five-eighth wave whips, etc., on the higher frequency bands do actually become antennas and the car body does act as a ground.

Finally, in the 1930s, when motor cars had running boards, the family Buick was fitted with a Airchief radio which had an antenna mounted **under** the running board. This so-called antenna provided a capacity return for the signal collected on the car body through the antenna coil in the receiver to ground.

So, please understand how the modern little wonders work.

REFERENCES

1981 — Barnes, T. W., Amateur Radio, May, p. 45.

1978 — Cook, R. R., Amateur Radio, November, p. 15.

1979 — Cook, R. R., Amateur Radio, February, p. 31.

1971 — Treharne and Johnson, IREE Convention Digest, May, p. 220.

1980 — Treharne, Symposium Problems in Radio Communications, IREE, Adelaide, Extracts of Papers, Paper No. 33. ■

HAVE YOU CHECKED YOUR CALL-SIGN IS CORRECT ON YOUR AR ADDRESS LABEL?

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

10 Butler Street, Mallala 5502
21/9/81

The Editor,
Dear Sir,
Due to pressures of work over the last few years I am finding it difficult to operate — thus only very few contacts being made. I have recently received some QSL cards — all DX and mainly SWL — obviously someone is using my call sign and surname as handle. This worries me as I was once an SWL and was delighted to receive QSL, especially from DX

Would the person who is carrying on this illegal operating please refrain from doing so and be a "gentleman" and start studying for a licence

73 Lorraine M Earl VK5LM ■

October 12, 1981

The Editor,
Dear Sir,
Would like to correspond with and possibly set up skeds with amateurs in your country, so wondering if it would be possible to place a request in your magazine

Tnx and 73. Shelby W. Haukos KB0JW. ■

PO Box 109, Mt Druitt, NSW 2770
October 15th, 1981

The Editor,
Dear Sir
In regard to the letter by Jerry Ricketts VK5NRG, October AR 1981, the subject of SSB QRM in the CW segments, is I fear only the tip of the iceberg Jerry states that 15 metres seems to be a "safe haven" for these inconsiderates I would tend to agree, however I suggest that he also have a listen, or try to work the other novice allocations "QRM" free! (80-15-10)

The low end of 28 MHz is plagued by CB rogues and Asian FM stations, and they know they can't be caught. In fact they'll challenge you to do so Both full and novice calls can be heard on SSB in this segment with their rag-chews as well

21 MHz will become a shambles as the solar cycle wanes, and more refugees from 28 MHz crowd into the 75 kHz band width seeking DX or VK contacts. I admit everyone has a right to a spot in the spectrum, but under such crowded conditions, it is no wonder that the "side banders" will QSY to the CW segments If the contacts are brief, most keymen will give them a clear go, but prolonged "nets" of 4-6 hours must be the limit surely Incidentally, how many of those that do ask QRL think to listen on a vertical antenna, or turn their beams/quads around the 360 degrees just to be sure? Precious few, I'm sure

Knowing that various regions in the world have different allocations of frequency and mode of operation it is easy to have a small part of the spectrum loaded to the hilt with many transmission modes at peak times, and no one can deny them their right to be there They, as well as myself, have fought hard to obtain those privileges, and I defend their right to do so to the letter But I will defend to the death my rights that I have worked hard to earn. Chances of an early upgrade in licence seem slim to me, and every little bit of spectrum that is accessible to me is very precious indeed My privileges and rights were set by the guidance of those that went before me, and were hard fought for The rules they laid down may not be exactly to my liking, but I will respect them, as they are the rules for the majority, not the few

To those that persist in not abiding by the "agreements" made by your fellow operators, please consider the chaos that you cause Not only in this country but also to DX stations, trying to work VK In all fairness, fellows, please give us a fair go!

Jerry, I suggest you come to VK2 and listen to the AOCPs that operate SSB in the CW segments — boots and all, not to mention the novices, too A recent QSO on 21 135 ± had ZL, VK2s, VK1, VK4s, VK6s, VK8, G3, ad infinitum, but despite

previous polite requests to the principles of this net, it is still touted as a daily net in the CW segments. In closing, I would ask those who disregard the agreements, please respect our rights and privileges and we'll respect yours as well. Otherwise it's feasible that controls may be needed and ultimately we stand to lose our amateur service privileges.

Yours fraternally,

Colin Stevenson VK2VVA ■

The Editor,

Dear Sir,

I would like to comment on interferences caused on WICEN frequencies during "exercises".

On the weekend 9-11th October, 1981, WICEN operators from Regions 3, 4 and 5 of the Queensland WICEN net provided communications for the annual horse endurance trials between Warwick and Nerang, a distance of 200 km through some of the roughest country imaginable (with the exception perhaps of some parts in VK7 land).

Because of the terrain and the fact that a number of "novice stations" participated, all operations were done on 3.60 MHz, both night and daytime operations. Why 3.605 MHz? Quite simple, 3.600 MHz, the official WICEN frequency is, at night time, impossible to work on in Queensland and northern New South Wales because of severe interference from a broadcast station, thus 3.605 MHz is a WICEN frequency in VK4.

It is therefore with regret that I have to report that some radio amateurs persisted in using 3.605 MHz as a rag-chew frequency, despite several requests to leave the frequency clear. It may be of interest to those amateurs to learn that on some occasions early on Friday evening, when one horse was missing, their signals made communications between the control points very difficult. Excuses such as "I can't hear them, so they can't hear me" are nonsense. It only indicates that the antenna system in question needs proper line-up or reconstruction, specially since mobile anttenas were able to receive those stations.

The moral of the story: If asked by a WICEN station to QSY, please do so, lives may be endangered.

Thank you on behalf of WICEN in all States.

John Aarsse VK4QA,
VK4 Region 4 Co-ordinator. ■

TECHNICAL CORRESPONDENCE

The Editor,

Dear Sir,

I have read with interest the series in the magazine "A Review of Antenna Noise Bridges". The author has covered many aspects of bridges and bridge balancing thoroughly. I must congratulate him on his ingenious method of balancing the series component of reactance in his own bridge design in May 1981.

There is unfortunately one serious defect in all the bridges described and this defect is worst in the bridges, Figs. 1b and 1c, making these bridges basically unsound in principal.

A bridge has four terminals and one of these is usually earthed. In a bridge, either one side of the generator can be earthed and the detector must be floating or one side of the detector can be earthed and the generator must be floating. Many of the bridges in the article use transformer ratio arms with a 1 : 1 ratio. This is done by using two windings bifilar wound and this is an excellent way of producing accurate 1 : 1 ratio arms but a quadrifilar wound transformer with a high capacitance between the secondary, earth and also to the generator will not be floating but will be tightly coupled to the generator and earth.

Capacitance between the secondary winding of the generator and other parts of the circuit will be effectively in the form of a delta across the secondary and to earth. Capacitance between the secondary and earth will be represented by capacitance shunted across the standard and the unknown arms. Capacitance between the secondary and the generator could produce a worse effect by applying an error signal to the detector.

These stray capacitances are shown in Figs. 4a to 4d. It might at first appear that they are balanced and therefore inconsequential but consider that the standard arm, the detector and the unknown arm are connected in turn between the three secondary taps and earth. Therefore all these strays are effectively shunted across the bridge arms.

In sophisticated bridges these errors are eliminated in several ways. Direct capacitance coupling between the transformer secondary and the generator is eliminated by the use of electrostatic shielding. This method is referred to in one of the circuits. One method of eliminating capacitance to earth from the transformer secondary is by the use of a Wagner balanced shield. Methods used to eliminate these effects in more advanced bridges are unfortunately quite undesirable for these simple noise bridges but good isolation must be obtained to minimise errors. **Quadrifilar wound transformers are absolutely the worst method of doing this.**

The circuits of Figs. 1b and 1c are even worse than this. They have no isolation between the transformer primary and secondary at all. Both circuits use resistance raito arms. Presumably the detector is earthed in both bridges although only one is shown earthed. The common of the circuit is not shown earthed in Fig. 1b, although that of Fig. 1c is earthed. This makes little difference as the capacitance of the circuits to earth is sufficient to regard all commons as at least partially bypassed to earth. These bridges have in effect 6 arms instead of 4. The bridges may work when the standard and unknown are of equal resistance but the errors under any condition would be considerable. The statement in the text that the balun gives good isolation between the bridge and the generator is incorrect. Actually the bridge is tightly coupled to the generator through the balun.

It is regrettable that this excellent treatment of bridge balancing has been marred by a basic misunderstanding in bridge methods, although it would appear that the authors of all the bridges mentioned show a similar misunderstanding. These bridges may give a reading and they are most likely to be correct mid-range but it largely depends upon how the various strays add and subtract.

J. Adcock VK3ACA. ■

AUTHOR'S REPLY

John's letter adds weight to my warnings of the importance of having a good transformer. If he had been unable to make his noise bridge work to his satisfaction, then strays may have been the trouble; but then again he may have been expecting too much from the little instrument — a rather primitive device compared with expensive laboratory type RF bridges.

That transformer is very important! I have been contacted (by letter and on air) by a number of hams to discuss aspects of the noise bridge. Some have struck trouble, just as I did earlier on, when using "any old toroidal core" for the transformer. The material of the core, as well as the number of turns, are part of the transformer design; unfortunately I am not too familiar with this specialist subject. The W6BXI/W6NKU design has a 14 turn quadrifilar winding on an Amidon T50-2 and is excellent, just as are the transformers in the Omega-T and Palomar bridges, particularly if they have been rewound as quadrifilars as in the W6BXI/W6NKU design. This seems to disagree with John's findings. There is some confusion amongst noise bridge enthusiasts as to whether these multifilar wires should be twisted together or wound side-by-side. I am a "twister" myself because I think twisting is more likely to make inter-filar capacitances equal.

Regarding the baluns of Figs. 1b and 1c of part 1 of my article, as used in the WB2EGZ and Galbraith bridges, this is part of that same specialist subject. Like John, I did not have much success when I tested that type a long time ago, perhaps that was before the importance of the core material had dawned on me, and perhaps I did not persevere for long enough, but I was anxious to move on to the RX bridges at the time.

Reverting to what we should expect from a noise bridge; the strays **must** cause errors, and that includes the strays in the transformer and in the components and wiring of the bridge circuit. These are what limit the bridge's impedance and frequency range. A good noise bridge can give quite accurate readings of impedances close to 50 ohms non-reactive, for frequencies up to 30 MHz. Stray-caused errors start to become apparent as the impedance being measured deviates from this value, particularly at the higher frequency bands. However, the May 1981 AR series bridge can provide good practical accuracy of readings for impedances in the entire 2 : 1 SWR range over the whole HF spectrum. The W6BXI/W6NKU parallel type bridge is just as good except at the high end of the spectrum.

Perhaps I may use this opporunity to mention some recent developments. The 1981 ARRL Handbook, I believe, has a description of a noise bridge with a novel noise source. It contains a 555 IC which chops the noise at an audio rate, creating a distinctive sound to assist in balancing in the presence of other noise from antenna or receiver. I haven't received my copy yet, but I understand that a different core and transformer design is used.

Bruce Henderson VK2DFH and friends have a very worthwhile project well under way, constructing noise bridges for incorporating in antenna tuning units for some of our sightless friends, to enable them to tune their antennas aurally. Good work, Bruce. We look forward to seeing this written up in AR some time.

Bill Cavanagh VK2WC has made a number of measurements to compare the results from a series and a parallel bridge and he was pleased to report that after doing the necessary series/parallel conversions the two bridges' readings showed very good agreement.

Bob Slutzkin VK3SK. ■

TECHNICAL EDITOR'S COMMENT

After discussions with both Bob and John I feel it is necessary to add further comments.

Both agree that measurement errors will occur due to the primary and secondary windings being capacitively coupled. For some particular transformers Bob has found that the errors are acceptable for a VSWR not exceeding 2 : 1.

John, being a measurement enthusiast, is concerned that the transformers as described have inbuilt errors that could be avoided.

The purpose of the transformer is to provide:—

(i) a floating voltage source independent of the earth;

(ii) a pair of equal arms for one half of the bridge.

John has recently suggested to me an alternative transformer construction. The primary would be wound as a single winding covering almost one-half of a torroidal core. The secondary would be bifilar wound to cover almost all the remaining half. This physically separates the primary and secondary, thus reducing very much the interwinding capacitance. There will be a reduction in the magnetic coupling too, so a core covering the HF range with a high permeability would be required.

This seems worth testing and, for the experimenter, I would like to offer a further suggestion. Commercial bridges use a form of Faraday screen to eliminate inter-winding capacitances. Most amateurs would find it difficult to manufacture a copy of such a winding.

If the primary winding wire were replaced with a piece of very thin coaxial cable then a trifilar winding could be made. The secondary wires would be twisted together and wound with the primary so as to cover the complete circumference of the torroid. The inner coax conductor would become the primary and the screen would be connected to the centre tap of the secondary. We would have a driven Faraday screen which guarded the secondary from capacitively coupling to the primary yet allowed tight inductive coupling.

Bob Slutzkin's article represents an advance in the state-of-the-art of measurement for radio amateurs. Further advances, such as suggested by John Adcock, are there to be made and Bob will be assisting to make them. I look forward to hearing of more progress soon.

VK3AFW. ■

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. R. JAGO VK2YJJ

OBITUARIES

Mr. W. JENVEY VK4AZO

Bill Jenvey VK4AZO passed away on 11th August last at Noosa Heads, Queensland, aged 77 years. Bill had a long and varied involvement in communications. His father started with the Victorian Post Office as a telegraphist and was their Chief Engineer at the time of his retirement. He was also the first person in Australia to send a radio message ship-to-shore in 1901.

In December, 1918, Bill joined Oakleigh Post Office in Victoria as a telegraph messenger. A year later he moved to the Central Telegraph Office, Melbourne, and then transferred to the PMG Wireless Branch. While there he studied for his First Class Certificate of Proficiency in radio telegraphy. This course consisted of radio operating and radio and electrical theory and practice. On obtaining his certificate, Bill went to sea as radio operator on the Government lighthouse service ship, the Lady Loch.

In August, 1926, Bill was one of the operators chosen by AWA to work in the Victorian Police Wireless Branch, which had just started fitting patrol cars for wireless telegraphy. Victoria was the first State in Australia to so equip its police cars. They used a small portable transmitter receiver in the car with a collapsible mast mounted on the running board. At Russell Street Headquarters there was a large aerial and two masts, while AWA had a two kilowatt transmitter and valve receiver. Efficient communication in Morse was maintained over about 32 km from headquarters.

Bill remained with the Police Department for 12 years, developing and upgrading the system. During this time he studied by correspondence for a wireless technician's course with the Marconi School of Wireless. On obtaining his certificate in 1938, he became a technician at Braybrook Receiving Station, Victoria. He remained there for six months and then transferred to the AWA laboratory at Ashfield, Sydney, and was promoted to Engineer.

Bill's duties at Ashfield involved working on the development of an Air Force AT5 transmitter and AR8 receiver, which became standard Australian Air Force equipment. Many Australian amateurs used the AT5 and AR8 equipment after the Second World War when it became available from disposals. In 1943 Bill transferred to Melbourne Beam Development Laboratory, working on improving Australia's international communications links with London, Montreal and other cities. Bill's next move was in 1947 to York Street, Sydney, as traffic plant engineer. In 1952 he was sent to Spring Street in charge of the installation and amalgamation of the cable and wireless service into a combined operating room. His next major assignment was organising, with assistance, the relay of facsimile pictures of the Queen's coronation to Sydney and Perth, using portable Times equipment temporarily installed in the Sydney and Perth GPO. In 1955 Bill was involved in planning the communications link for the Melbourne Olympics. He then went to Melbourne to supervise the installation of equipment at the Melbourne Cricket Ground, venue for the games, and to organise the multitude of radio circuits which were required. In 1957, he was promoted to Supervising Engineer, followed by Chief Engineer in 1962. From then until his retirement in 1964 Bill wa sassociated with the Coast Radio Service, instituting a programme of replacing coast radio stations which had been built out by domestic housing.

Bill was first licensed in 1928 with the call sign OA3AY, which became VK3AY in 1930. Other VK call signs held were VK2ZO and VK4AZO. In 1975, 11 years after retirement from OTC, Bill (at 70 years of age) revalidated his Frist Class Operator's Certificate and spent a term at Nauru as station manager. While there he kept in touch with his friends under the call sign C21ZO. On returning to Australia he retired to Nelligen, inland from Bateman's Bay, and became a member of the Mid South Coast Amateur Radio Club. Because of a deterioration in his health, he joined his son Randall and family at Noosa Heads, where he spent the remainder of his days.

Bill is survived by his daughter Norma and son Randall, to whom we extend deepest sympathy. Because of his pleasant and friendly manner, Bill made friends wherever he went. It could truly be said that he was one of "nature's gentlemen".

The funeral took place at Buderim Crematorium on 13th August. A memorial service held at Sydney's Northern Suburbs Crematorium on Friday, 21st August, was attended by a large gathering of Bill's friends, including management and staff of OTC and members of the amateur radio fraternity.

Submitted by Ivan Agar VK2AIM. ■

COL GIBSON VK3FO

Col Gibson died on August 16, 1981, at Maldon, Central Victoria (his birth-place), after a relatively short illness, at the age of 75 years. The word "relatively" is purposely chosen. Col, a victim of poliomyelitis since early childhood, was too involved with living (and amateur radio) to bother about his life-long dependence on crutches, four-legged walking sticks — and ultimately a wheel chair.

Born only 11 years after Marconi's first public demonstration of "wireless" (Morse code over 4 miles), Col, from his early youth, was an enthusiastic radio experimenter. In 1923 (at the age of 18) he gave a public demonstration of "wireless" reception to an enthralled audience in the Maldon Shire Hall, using his own home-built equipment. Again, 33 years later, he gave his first public display of TV in Maldon.

As a young man, Col Gibson was forced to move to Melbourne in search of employment After some years in the leather trade and another short "career" with a large photographic firm, he graduated to picture theatre operating — and thence to his true goal — his own radio and electrical shop in Centre Road, Bentleigh. Gaining his amateur licence in 1947, he soon became a dedicated worker for the WIA. Ultimately he was elected Secretary of the Victorian Division, a position in which he gave memorable service.

In the early fifties Col moved "home" to Maldon and opened an electrical shop in the main street of the now "First Notable Town in Victoria". He devoted his spare time (apart from amateur radio) to writing — his published works including "The Gold Mines of Maldon" and a history of Education in the Maldon District.

At Col's funeral service radio amateurs from far and wide joined the local residents in paying their last respects to a great citizen. But perhaps the most revealing tribute was a message in the local newspaper from the young members of the Roller Skating Club: "Always ready with a smile and chat. We'll miss you greatly." Physical disability and generation-gaps presented no barriers to Col.

Deepest sympathy to Col's wife Pat, daughter Cheryl and son Andrew in their close personal loss . . . but also sincere thanks to all three for helping Col to give so much to amateur radio — and humanity — in his final years.

Murray Palmer VK3AMP. ■

INTRUDER WATCH

The new Federal Intruder Watch Co-ordinator is

BOB McKERNAN VK4LG
P.O. Box 50
Sandgate, Queensland 4017

ADVERTISERS' INDEX

AMATEUR RADIO ACTION	46
ANDREWS COMMUNICATIONS	41
ATN ANTENNAS	34, 40
BAIL ELECTRONICS	15
BRIGHT STAR CRYSTALS	37
CHIRNSIDE ELECTRONICS	5
DICK SMITH	2
EMONA	21
GFS	52
HELRAY ENGINEERING	5
NSW DIVISION WIA	31
SCALAR INDUSTRIES	26, 29, 32
SNOWY RIVER CO.	25
VICOM PTY. LTD.	19
WILLIAM WILLIS	34
W. &. G. WULF	31

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means address is correct as set out in the WIA 1979 Call Book.

FOR SALE

Yaesu FT7 Txcvr., mint cond., extra xtal, 10m CW, handbook, $350. VK2KDX (VK2NXD), QTHR. Ph. (02) 607 6261.

Kenwood TS520S Txcvr., AC-DC, as new, in carton, with handbook, 12 hrs. use, spare new finals; Kenwood DGS, as new, MC50 desk mic., SP50 external speaker, 5 band trapped dipole; best offer over $500. L30833, QTHR. Ph. 45 2966.

Video Camera, Asaca 240V, black and white, RF and video output, ideal for security or amateur television, $250, ONO; Velbon tripod, $40, ONO; both items only 10 months old, $280 the lot. Frank VK3ZO, QTHR. Ph. 480 7267 Bus., 478 5972 AH.

Icom 22 2m FM Txcvr., repeaters 6700, 6800, 6850, 7000, channels 40 and 50 and others, car mount bracket, manual, mic., orig. carton, $145. Dave VK4ADI. Ph. (071) 82 3236.

Chirnside 10-15 Meter Beam, 3 el. on each band, $120, ONO; 10-80 vertical trap, $50; Morse code oscillator, $10; Morse key, hi-mound, $18; CB Apollo 18 ch. SSB-AM, $120, ONO; CB Wasp 18 ch. AM, $50, ONO. Please apply in writing only. VK4CEF, QTHR.

4 el. Swan Tribander, TB4HA, superb construction, boom/element lock-keys keep elements aligned even with flocks of DX gallahs, low SWR, neat appearance, $200, ONO. George VK1GB. Ph. (062) 47 3296 or (062) 54 1985.

Yaesu Equipment: FT101B Txcvr., with G3LLL RF speech processor, ext. VXO, SWR meter, mic., manuals and spare valves, mod. to transmit full power 10 MHz, $400; FT7 Txcvr., with AC/PS, $375; FL110 solid state linear, will run over 100W out even when stationary mobile, 5-15W drive, $175; last two items as new, with orig. cartons. Ray VK3RF. Ph. 878 5305.

Yaesu FT227R Txcvr., with VE2AED scanning unit, $250. VK2BZY, QTHR. Ph. (048) 61 1683.

Amateur Gear: TS520S, as new, $485; TS120V with mobile bracket, mic., low pass filter, also fitted 27 MHz, A1 cond., $425; power supply 12V 4A, $25; HF linear amp. 200W, as new, $150. Ph. (02) 918 3628.

Kenwood Shack, as new, orig. packing, complete with manuals, TS520S DC-DC converter, CW filter, MC50 mic., AT220 tuner, DG5 digiscan, external VFO520 and SP520 KR400 rotator, 3 el. yagi, 18 AVT vertical trap, Heather electric keyer, quantity coax, etc., $1550, ONO. Bob VK2VFR. Ph. (063) 62 5540 AH.

Yaesu F8301 and FV301, also incl. mic. and 12V hook-up, orig. carton, handbook, $600, ONO. Colin Howe VK3BE. Ph. (051) 34 5058.

Txcvr., FT DX 560, $450; ham rx., AX190, $150; Heathkit dummy load, $40; Dick Smith freq. counter, $85; Diawa cross needle SWP power meter with antenna switch, $75; power supply 13.8 2A, $20; 2 low pass filters (Dick Smith), $5 ea.; one 11m helical whip, $18; one 10m helical whip with base, $24; one Musicolour III sound to light converter, $50. VK3NSM, QTHR. Ph. 743 6992.

Eddystone 940 Rx., 2 RF, 2 IF, xtal filter, product det., manual, 1st RF stage cascade, orig., superb performance, $125. Norman. Ph. (02) 774 1827.

Kyokuto FM 2010 A 800 ch. 2m Txcvr., 4 memories, plus scan, $150; Kenwood TS180 DFC, dual filters, as new, carton, manuals, $900; TV 502 2m Tverter., modified for operation with TS180, $120; AT 200 ATU, $75; Kenwood SM 220 station monitorscope, $250; Yaesu FR 101 Rx., 1.8 MHz to 30 MHz, plus 2 and 6m, $525; Lunar HF 3-100L2 mobile linear, 7140. Offers. Ph. (02) 57 4648.

Kenwood 520S with DG5 digital display, both mint cond., with orig. carton and operating manuals, $620. VK4ATQ, QTHR. Ph. (07) 374 1008.

2m Transverter for F2101 series, the FTV250, complete, brand new cond., hardlly used, $165; Ringo 2m vertical ARX2, good cond., $30. Arthur VK3LJ. Ph. (053) 45 2031.

Kenwood TS520S Txcvr., with DC-DC converter for mobile use, good cond., $480. VK2AZT. Ph. (069) 42 1392.

Yaesu FT401B, mint cond., with matching speaker and some spare tubes, converted to novice power, but easily returned to full power (560W PEP), last of the 400 series, with AM, fan and English manual, hear on air, would consider trade, swap for TS120V/S or similar mobile, cash adjustment, $450 firm. VK3VPC. Ph. (051) 57 1406.

Sideband SE-502 10m Txcvr., 240V AC 12V DC, built-in power/SWR meter, covers 28.28-28.60 MHz, frequency calibration chart and manual supplied, excellent reports on air, $90, ONO. Dennis VK5NDP. Ph. (087) 25 2427 AH, or write 36 Underwood Avenue, Mt. Gambier.

IC215 2m FM Txcvr., as new, repeaters 2, 3, 5, 8, 40 and 49, $220; also class C power amp., 30W output, diode switching, $50, ONO. Stan VK3BNJ. Ph. (03) 743 6708.

FT200, FP200 antenna coupler, HC-500A SWR power meter, VC-2 TVT monitor, 9 in. TV, Kenwood ham clock, mic., key, planet lamp, handbooks, tri-band trap antenna, unused, phones, $500. VK3DGO, 82 Power Avenue, Chadstone 3148. Ph. (03) 277 3317.

FT DX 401, mint cond., complete set new spare valves, blanker, fan, 400W PEP, 80-10m, $350; Belcom SSB on 10m, full cover 28.348 to 28.638, $80. VK2DFV, QTHR. Ph. (044) 47 1449.

Shack Clearance: TS130S, perfect, $550; TS180S, as new, $700; FT101E, as new, $500; Drake TR4B, $300; Drake TR4C, $300; Collins S line, $1000; Leader ham scope, $200; AT230 tuner, $175; AT120 tuner, $80; HS5 headphones, new, $20; PS30 power supply, $175; FM321 UHF, $250. Cliff VK2VK. Ph. (065) 52 4477 Bus., (065) 59 1508 AH.

Hallicrafters SR150 Txcvr., 80-10m, one of their best, with PSU, handbook, 2 x 6146Bs in final, plenty spare tubes and transformer, $450. Ph. (02) 99 3323 or write PO Box 353, Avalon Beach 2107.

BK Precision 6 Digit Freq. Counter, AC or DC, 100 Hz to 30 MHz, $60; power transformer, 800V CT 150 mA, suitable for LP linear, $15; 1-250 mA and 1-100 mA Weston 3 in. meters, $10 ea.; Philips 10W valve, P/A wants new O/P transformer, $10. VK3PR, QTHR. Ph. (056) 62711.

IC502 SSB/CW 6m Txcvr., with 30W linear (solid state), both units in excellent cond., $200. Noel VK4KTX. Ph. (074) 22 2533 Bus., (074) 22 1959 AH.

IC701, excellent cond., complete with PSU, mic., cables, handbook, $900, ONO; Chirnside trap vertical, 10-80m, complete, plus set of radial traps, good cond., $70. Arthur VK3LJ. Ph. (053) 45 2031.

Panadaptor, 455 kHz input, made by EMI for Navy, with handbook, $75; Tellettra selective voltmeter, 20 kHz to 6 MHz, $60. John VK2AUI, QTHR. Ph. (02) 90 2793.

Drake R4C Rx, extra xtals, noise blank; Drake T4X Tx, with power supply, spare finals, $650; RTTY test equipment — Siemens telegraph signal analyser, TMBE 125A, 45/70/100 baud, 5 or 6 unit code, holding circuit 30 to 60 mA; Siemens resistance insultator tester PE 136; Siemens current leakage tester PE 191; Natronics AC voltage stabiliser, regulate —20 per cent +10 per cent stability 0.25 per cent; Siemens teleprinter drive unit, 45/75/100 baud. VK3BVD. Ph. (03) 762 1688 Bus., (03) 762 3349 AH.

Yaesu YO101 Monitorscope to suit and match FT101E, perfect cond., includes 2 tone oscillator, suitable for RTTY, etc., all cables, no mods., can be used as GP CRO, used approx. 4 hours, genuine, $230. VK3NWW, QTHR. Ph. (03) 560 3773.

TONO 7000 Communication Computer, as new, $635; matching 5V 2A fully regulated PSU, $30; VDU board as per EA Feb. 1978, working, $35; Daiwa RF550, top of the range speech processor, as new, $95. VK3ARZ, QTHR. Ph. (03) 584 9512.

Swan 350 Txcvr., calibrator, CW tone osc., no VOX, spare pair finals 6HF5, 6GK6, 12BE6, HB power supply, mic. and stand, int./ext. speakers, manual, $350; Kyoritsu SWR meter, $15; KW E-Zee match, $60; preferably the lot. Jack VK3AXQ, collect Hawthorn. (Ph. (03) 819 2005 or (054) 75 2609.

TS600 6m all mode Txcvr., /425; Dick Smith direction finder Rx, LW, MW, MB, FM, VHF, $65; Hitachi AM, LW, SW, FM stereo radio cassette recorder, c/w speakers, PC, $175; National AM SW1-SW6 FM Rx, cost $180, will sell $100; Princess portable TV with AM, SW, FM radio cassette recorder, $150; slow scan converter board with IC sockets, $100. Lionel Curling VK3NM. Ph. (03) 88 3710 home, (03) 568 2733 work.

TS520 with digital readout, DC converter, instruction books, mic., excellent working order and appearance, little used, orig. cartons, will arrange on-air demo. if required, $695. VK4RM, QTHR. Ph. (071) 49-7151 any time.

FT200, matching AC power supply, grey case, blower fan, Shure 401A mic., full set new spare tubes, incl. 4 finals, instruction manual, no mods., clean cond., $340 firm. Ron VK4BF, QTHR. Ph. (077) 71 5802.

WANTED

Yaesu FV50 Type VFO, or information about same, will gladly pay postage and copying costs. VK5YX, QTHR. Ph. (08) 271 5350.

Drake Rx DSR2, must be in good working order, with instruction book and case. David Deerman. Ph. Charleville 278.

Monitorscope YO100 or Y0101, up to $100, also Shure 44 to $50. Ph. (03) 398 4192.

Circuit information or service manual for Pye Cambridge FM10DV txcvr., also information on RF oscillators, type numbers 19/9A and 10/9B, maker unknown, will pay for photocopies, etc. Ian Bedson L50561, QTHR. Ph. (08) 277 5683.

WW2 Mobile Txcvr., to fit restored Jeep, models 19, 22, 122, 62, AR8/AT5 or similar, prefer complete station, but after 40 years anything will do, also valves, type 548, cables, mic., headphones, etc. for TBY8 Navy Tx., and Army backpack, mod. 46. A. Christopher VK4VE, 21 Keenan Street, Margate 4019.

Circuit Diagram for Trio 9R59DE Rx, will pay costs. Roger L60136, QTHR (1908).

Bug Key, Vibroplex original or Lightning Bug model. Frank Lewis VK2DMW, Farm 151, Leeton, NSW. Ph. (069) 55 6458.

EXCHANGE

Beam Antenna Book, by Orr, signal generator (University Graham), 150 kC, 30 MHz, valve type, stepping attenuator/voltage control, CW/modulation, etc., model Y4 240V AWA CRO mod. 1A56301, valve type, working order (no probes), 240V radio shack PWR/SWR/modulation unit, 3 meters 5-50-500W ranges, remote sensor unit, Hy-Gain 5 el. Long John yagi, 10/11m, lightwenght — Quad Book, by Orr, CW/notch filter, suit Tentec 515 noise Bridge (RF), RLC bridge, any offers. Colin VK2VVA, QTHR. Ph. (02) 625 5497.

TRADE HAMADS

RTTY Siemens 100A, $120; UHF FM321, all 40 ch. plus repeaters on 70 cm, $299; MLA2500 linear amp with large front panel, 2000W power output meter, 1.8 to 30 MHz, AM, SSB, CW, RTTY, SSTV, $750; FRG7 rx, 500 kHz to 30 MHz, $275; ex RAAF Pye aircraft transceiver, 110 to 140 MHz, $45; UHF FM320 transceiver, $259; new W65 18 ch. SSB CB radio, $179; new W65 40 ch., $195; 18 ch. walkie talkie, $110; 40 ch. CB with scanner, $99; 23 ch. CB, $55; 18 ch. CB, $69; 27 and 28 MHz 4 el. beam, $79; helical ant., $8.50. Different rigs coming in each day. When in Sydney drop into Park Disposals, 32 Park Street, Sydney, 2000, near Town Hall Railway. Ph. (02) 264 7515. Rigs posted anywhere in Australia, NZ, PNG, Pacific add $5.

Amidon Ferromagnetic Cores: Large range for all RF receiver and transmitter applications. For data and price list send 105 x 220 SASE to: R.J. & U.S. Imports, Box 157, Mortdale, NSW 2223.

PHOTOGRAPHS FOR AR

Don't keep them to yourself

SEND THEM IN — NOW

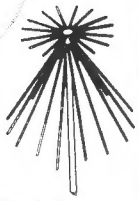
UPDATED VERSION

NEW J.I.L.SX-200

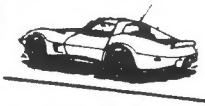
GFS electronic imports

NOW MONITOR AIRCRAFT, POLICE, AMBULANCE, 10, 6, 2 & 0.7mx AMATEUR BANDS. HF & UHF CB, PLUS HUNDRED MORE. INCLUDING SERVICES IN THE AUSTRALIAN LOW BAND

FEATURING:
- Airband
- Australian low-band



Ask about our range of BASE ANTENNAS.



J.I.L.

PROGRAMMABLE SCANNER DOES IT ALL. 26 - 180MHz, 380 - 514MHz.

SPECIFICATIONS

- **Type:** FM & AM
- **Frequency Range:** a) 26-57.995 MHz Space...5 kHz; b) 58-88 MHz Space...12.5 kHz; c) 108-180 MHz Space...5 kHz; d) 380-514 MHz Space...12.5 kHz
- **Sensitivity:** FM..a) 26-180 MHz 0.4uV S/N 12 dB; b) 380-514 MHz 1.0uV S/N 12 dB; AM .a) 26-180 MHZ 1.0uV S/N 12 dB; b) 380-514 MHz 2.0uV S/N 12 dB
- **Selectivity:** FM.....More than 60 dB at —25 kHz; AM.....More than 60 dB at —10 kHz
- **Dimensions:** 210 (W) x 75 (H) x 235 (D) mm; 8-1/4 (W) x 3-1/4 (H) x 9-1/8 (D) in.
- **Weight:** 2.8 Kgs.
- **Clock Error:** Within 10 sec./month
- **Memory Channel:** 16 Channels
- **Scan Rate:** Fast .....8 Channels/sec.; Slow .....4 Channels/sec.
- **Seek Rate:** Fast .....10 Channels/sec.; Slow ..... 5 Channels/sec.
- **Scan Delay Time:** 0 or 4 sec.
- **Audio Output:** 2 Watts
- **Ant Impedance:** 50-75 ohms; Whip or External Antenna with LO/DX Control (20 dB ATT.)
- **Freq. Stability:** 26-180 MHz ... Within 300 Hz; 380-514 MHz ... Within 1 KHz

The new SX-200 represents the latest STATE-OF-THE-ART technology in the development of Scanning Monitor Receivers. It has many features that previously have not been available on receivers of its type.

For example the tremendous frequency coverage, which encompasses all of the following bands:— HF & UHF CB, 27 & 155MHz MARINE, Australian LOW BAND, AIRCRAFT band, VHF SATELLITE band, 10Mx, 6Mx,2Mx and 70CMx AMATEUR, VHF HIGH BAND and UHF TWO-WAY band. Other features include Automatic detection of AM or FM on all bands, Squelch Circuitry that can be used to LOCK OUT carrier only and spurious signals, Fine Tuning control for off channel stations, 240 VAC plus 12VDC operation, Squelch Operated Output that may be used to trigger a tape recorder or channel occupancy counter and accurate Quartz Clock.

Now cover the VLF BANDS with your SX-200.

5 KHz to 1500 KHz

With the addition of a

DATONG VLF CONVERTER

- Excellent sensitivity
- Connects simply in series with antenna lead of SX-200

PRICE $109 plus $4 Post

$512

+ $8 P&P

TRADE ENQUIRIES WELCOME

Australian Agent:

AUTHORISED DISTRIBUTORS:
W.A.: Letco Trading Co. (09) 387 4966
N.S.W.: Emtronics (02) 211 0531
Qld.: C.W. Electronics (07) 397 0808
Plus many other regional outlets.
CONTACT GFS FOR YOUR NEAREST STOCKIST.

G.F.S. Electronic Imports, 15 McKeon Road, Mitcham, Vic. 3132 (03) 873 3939